Mines and Minerals Division

Ontario Geological Survey
Miscellaneous Paper 134

91-04605/

Report of Activities 1986 Regional and Resident Activities

edited by
C.R. Kustra

1987

Ontario
Ministry of
Northern Development
and Mines

©Queen's Printer for Ontario. 1987
Printed in Ontario, Canada

ISSN 0704-2752 (Series)
ISSN 0319-9487 (Subseries)

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Blackburn, C.E., Hailstone, M.R., Parker, J., and Storey, C.C.
1987: Kenora Resident Geologist's Area, Northwestern Region: p.1-33 *in* Report of Activities 1986, Regional and Resident Geologists, edited by C.R. Kustra. Ontario Geological Survey, Miscellaneous Paper 134, 322 p.

Scientific Editor: Guy Kendrick

1000-86-Deyell

Foreword

This report summarizes the activities of Regional and Resident Geologists for 1986, and includes accounts of mining, exploration, and geoscience activities in Ontario, prepared from information collected and filed by the Regional and Resident Geologists. Listings of new additions to the Assessment Files Records, and reports of government survey projects are provided.

Regional and Resident Geologists are located in key centres of the Mining Divisions of the Province to provide geoscience information and advice to the public on the geology and mineral deposits of Ontario. Each office maintains a library of published and unpublished reports, technical papers and monongraphs, publications of the Ontario Geological Survey and other government agencies, records of exploration activity submitted for assessment work credit, reports of property visits made by the Regional or Resident Geologists' staff, and information received directly from companies and individuals.

A wide variety of mineral resources-related investigations undertaken by regional minerals staff are reported here. These range from geoscience data inventories to technical studies on petroleum resources, building stone, industrial minerals, aggregate resources, and metallic mineral deposits.

Drill core storage facilities were operative in seven centres, including Kirkland Lake, Timmins, Sault Ste. Marie, Bancroft, Tweed, Thunder Bay, and Kenora. A core collection and cataloguing program developed by the Resident Geologists' staff at these centres has ensured that as much as possible of the available diamond-drill core is collected and stored.

C.R. Kustra
Regional Liaison Geologist
Ontario Geological Survey

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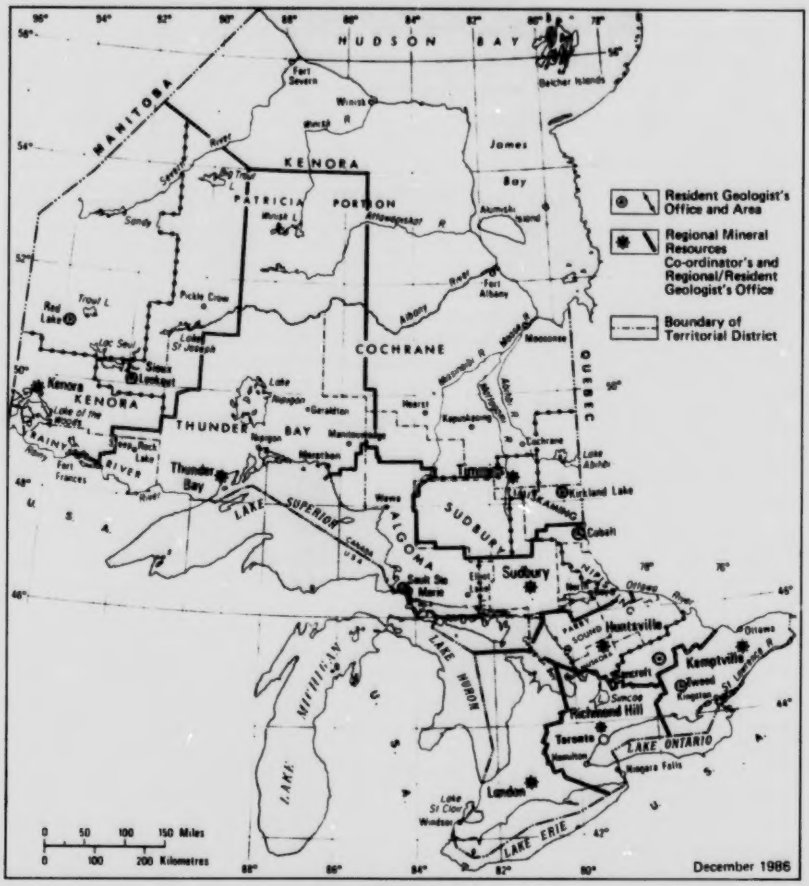
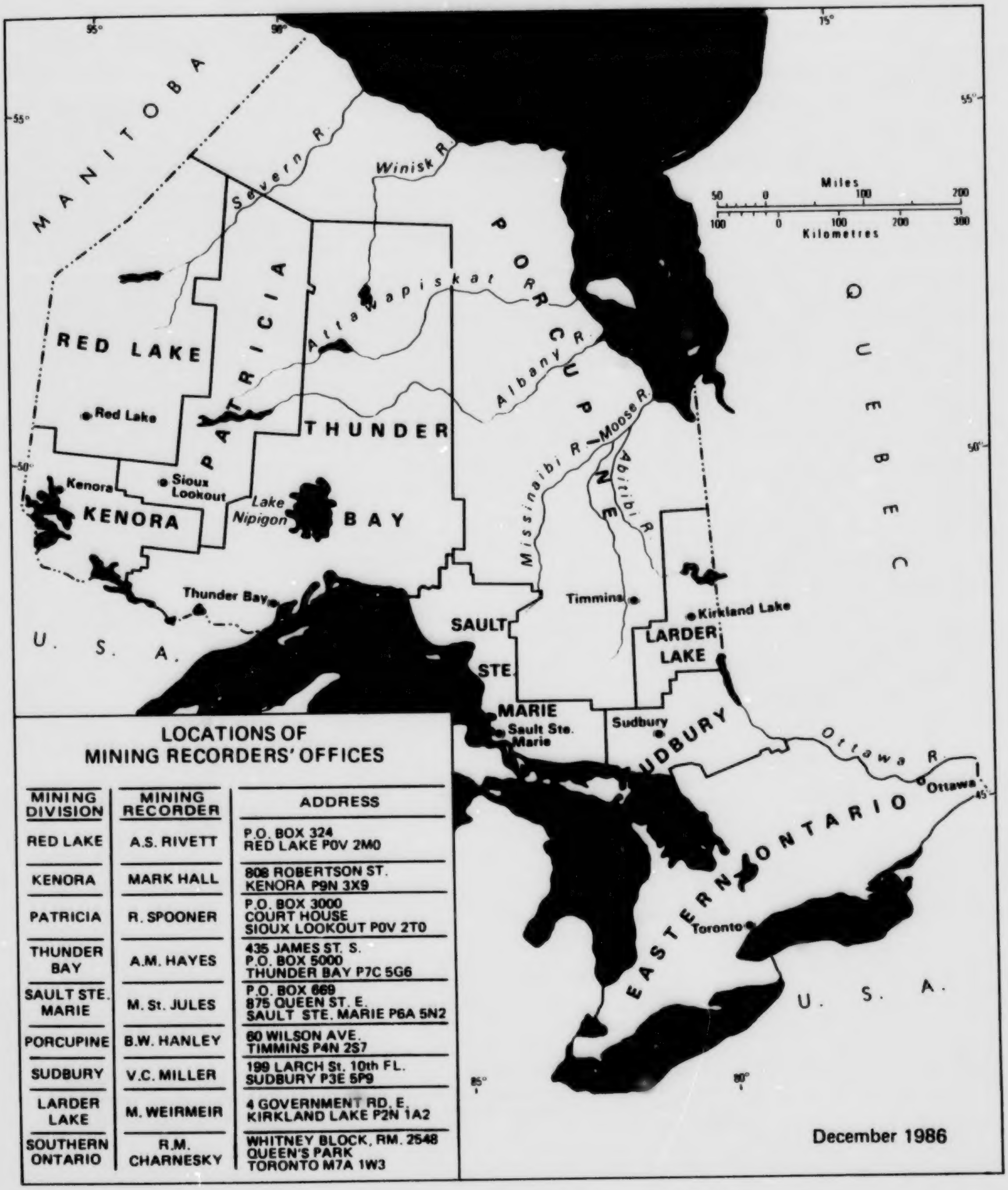

HUDSON BAY
Belcher Islands
Fort Severn
Winisk
James Bay
Akimiski Island
Fort Albany
Moosonee
MANITOBA
KENORA
PATRICIA PORTION
COCHRANE
QUEBEC
Red Lake
Sioux Lookout
Kenora
Pickle Crow
Lake of the Woods
THUNDER BAY
Thunder Bay
Geraldton
Nipigon
Marathon
Manitouwadge
Hearst
Kapuskasing
Cochrane
Timmins
Kirkland Lake
Cobalt
Wawa
SUDBURY
Sudbury
ALGOMA
Sault Ste Marie
NIPISSING
North Bay
PARRY SOUND
Huntsville
Bancroft
Kemptville
Tweed
Kingston
Ottawa
Richmond Hill
Toronto
Hamilton
Niagara Falls
London
Windsor
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
LAKE ONTARIO
LAKE ERIE
Lake St Clair
RAINY RIVER
Fort Frances
U.S.A.
Resident Geologist's Office and Area
Regional Mineral Resources Co-ordinator's and Regional/Resident Geologist's Office
Boundary of Territorial District
0 50 100 150 Miles
0 100 200 Kilometres
December 1986

GEOLOGISTS' OFFICES

Kenora	Box 5080, 808 Robertson St., Kenora P9N 3X9	(807)468-9841
Red Lake	Box 324, Ont. Govt. Bldg., Red Lake P0V 2M0	(807)727-3272
Sioux Lookout	Box 3000, Court House Bldg., Sioux Lookout P0V 2T0	(807)737-2037
Thunder Bay	435 James St. S., Thunder Bay P7C 5G6	(807)475-1331
Beardmore–Geraldton	435 James St. S., Thunder Bay P7C 5G6	(807)475-1331
Schreiber–Hemlo	435 James St. S., Thunder Bay P7C 5G6	(807)475-1331
Porcupine North	60 Wilson Ave., Timmins P4N 2S7	(705)267-1401
Porcupine South	60 Wilson Ave., Timmins P4N 2S7	(705)267-1401
Kirkland Lake	4 Government Rd. E., Kirkland Lake P2N 1A2	(705)567-5242
Sudbury	10th Floor, 199 Larch St., Sudbury P3E 5P9	(705)675-4120
Sault Ste. Marie	875 Queen St. E., Sault Ste. Marie P6A 2B3	(705)949-1231
Wawa	Box 1160, Mine Road, Wawa P0S 1C0	(705)856-2396
Cobalt	Box 230, Presley St., Cobalt P0J 1C0	(705)679-8558
Algonquin	Box 9000, Brendale Square, Huntsville P0A 1K0	(705)789-9611
Bancroft	Box 500, Highway 28, Bancroft K0L 1C0	(613)332-4875
Tweed	Box 70, 255 Metcalf St., Tweed K0K 3J0	(613)478-2330
Southwestern	11th Floor, 77 Grenville St., Toronto M7A 1W4	(416)965-0190



MANITOBA
QUEBEC
U.S.A.
U.S.A.
RED LAKE
PATRICIA
THUNDER BAY
KENORA
PORCUPINE
SAULT STE. MARIE
LARDER LAKE
SUDBURY
EASTERN ONTARIO
Red Lake
Sioux Lookout
Kenora
Lake Nipigon
Thunder Bay
Timmins
Kirkland Lake
Sudbury
Sault Ste. Marie
Toronto
Ottawa
Severn R.
Winisk R.
Attawapiskat R.
Albany R.
Missinaibi R.
Moose R.
Abitibi R.
Ottawa R.
Miles
50
0
100
200
100
0
100
200
300
Kilometres
95°
90°
75°
85°
80°
55°
55°
50°
50°
45°
December 1986

LOCATIONS OF MINING RECORDERS' OFFICES

MINING DIVISION	MINING RECORDER	ADDRESS
RED LAKE	A.S. RIVETT	P.O. BOX 324 RED LAKE P0V 2M0
KENORA	MARK HALL	808 ROBERTSON ST. KENORA P9N 3X9
PATRICIA	R. SPOONER	P.O. BOX 3000 COURT HOUSE SIOUX LOOKOUT P0V 2T0
THUNDER BAY	A.M. HAYES	435 JAMES ST. S. P.O. BOX 5000 THUNDER BAY P7C 5G6
SAULT STE. MARIE	M. St. JULES	P.O. BOX 669 875 QUEEN ST. E. SAULT STE. MARIE P6A 5N2
PORCUPINE	B.W. HANLEY	60 WILSON AVE. TIMMINS P4N 2S7
SUDBURY	V.C. MILLER	199 LARCH St. 10th FL. SUDBURY P3E 5P9
LARDER LAKE	M. WEIRMEIR	4 GOVERNMENT RD. E. KIRKLAND LAKE P2N 1A2
SOUTHERN ONTARIO	R.M. CHARNESKY	WHITNEY BLOCK, RM. 2548 QUEEN'S PARK TORONTO M7A 1W3

CONVERSION FACTORS FOR MEASUREMENTS IN ONTARIO GEOLOGICAL SURVEY PUBLICATIONS

If the reader wishes to convert imperial units to SI (metric) units or SI units to imperial units the following multipliers should be used:

CONVERSION FROM SI TO IMPERIAL			CONVERSION FROM IMPERIAL TO SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm²	0.155 0	square inches	1 square inch	**6.451 6**	cm²
1 m²	10.763 9	square feet	1 square foot	**0.092 903 04**	m²
1 km²	0.386 10	square miles	1 square mile	2.589 988	km²
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm³	0.061 02	cubic inches	1 cubic inch	**16.387 064**	cm³
1 m³	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m³
1 m³	1.308 0	cubic yards	1 cubic yard	0.764 555	m³
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 908 8**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

1 ounce (troy)/ton (short)	20.0	pennyweights/ton (short)
1 pennyweight/ton (short)	0.05	ounce (troy)/ton (short)

NOTE—Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries published by The Mining Association of Canada in co-operation with the Coal Association of Canada.

REPORT OF ACTIVITIES
1986
REGIONAL AND RESIDENT GEOLOGISTS

---

edited by
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1. Kenora Resident Geologist's Area, Northwestern Region

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[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[3]Economic Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[4]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Kenora

INTRODUCTION

Current permanent staff in the Resident Geologist's Office include C.E. Blackburn, Resident Geologist, M.R. Hailstone, Resource Geologist, and C.C. Storey, Drill Core Library Geologist. Contract staff during 1986 comprised the following people: Susan Turner and Margaret Guderyan, clerk-typists; C.B. Ravnaas, Drill Core Library Geological Assistant; J. Parker continued an Economic Geologist program in the general Dryden-Ignace area, assisted by R. Schienbein; and M. Patterson and G. Vogg prepared Geological Data Inventory Folios.

This report was written by Blackburn, Hailstone, Parker, and Storey. The section on "Quarrying Activity" was prepared by R.C. Beard, Senior Regional Geologist, Northwest Region, Kenora. Ravnaas and Schienbein aided with compilation of data. Schienbein drafted illustrations. The report was typed by Guderyan and Turner.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Numerous properties and areas undergoing active exploration were visited through the year. These are: Falconbridge Limited's option on A. Kozowy's gold prospect and adjoining patented lands, at Flambeau Lake, Van Horne and Aubrey Townships; the Pelham Prospect, Boyer Lake area, on which ground geophysics, stripping, geological mapping, trenching, and sampling were carried out by Esso Resources Canada Limited; and Noranda Exploration Company Limited, in two separate operations; the Pidgeon gold occurrence, Avery Township, where Noranda has done ground geophysics, stripping, geological mapping, and sampling; a copper-zinc occurrence in Bridges Township, undergoing diamond drilling by Rio Algom Exploration Incorporated; a new gold occurrence discovered in drilling close to the Electrum Lake Prospect, Ewart Township, by Calnor Resources Limited; the Gold Mountain Prospect and adjacent ground, Wiley Bay area of Lake of the Woods, optioned by Mountain Lake Resources, who performed stripping and sampling, and geological and ground geophysical surveys over adjoining claims; Proteus Reources Incorporated's claims adjacent to the Gold Sun Occurrence at the northern end of Kakagi Lake, in the Dogpaw Lake area, where they conducted ground geophysical surveys, sampling, and diamond drilling; Boise Cascade Canada Limited's Scramble gold prospect, Jaffray Township where diamond drilling was conducted in a joint venture with Madeleine Mines Limited; the Eschweiler gold occurrence, Jaffray Township, where Asarco Exploration Company of Canada Limited did stripping and sampling; a gold occurrence near Witch Bay, Code Township, investigated by Canadian Nickel Company Limited in a joint venture with Fort Knox Gold Resources Incorporated; the Patmour Occurrence and adjacent ground in the Rowan Lake area, on which Bigstone Minerals Limited, in a joint venture with Anglo Canadian Mining Corporation, followed up on ground geophysical surveys, geologic mapping, and sampling done in 1985, with a diamond drill program; the Rowan Lake Properties of Nuinsco Resources Limited, where reverse circulation drilling was conducted beneath Sullivan Bay in a joint venture with Echo Bay Mines Limited; the McKenzie-Gray Occurrence, Bad Vermilion Lake area, where Falconbridge Copper Limited conducted stripping, sampling, and diamond drilling.

Other prospects under evaluation, and inactive mineral showings were examined and reported on during the year.

At the beginning of the year a ten week, thirty hour, basic prospecting course was presented in Ignace by J. Parker, following a similar, very well attended course given in Dryden the previous year. Although attendance was lower, averaging ten, more individual attention could be given to attendees.

Three evening seminars were presented in Fort Frances by M.R. Hailstone, designed to update experienced prospectors on trends in the exploration industry, and on advances in geological concepts related to controls on mineral deposit location. Attendance was from eight to eleven prospectors.

J. Parker completed a mapping project in the Flambeau Lake-Larson Bay area, immediately south of Dryden. This project, at a scale of 1 inch to 400 feet, was conducted to provide a better understanding on controls of gold mineralization in an area that saw gold production in the early 1900s and again in the 1930s and 1940s. Results of this mapping program, combined with results of other work by staff of the Resident Geologist Office, were included in a paper presented in December at the Annual Ontario Geological Survey (OGS) Geoscience Research Seminar and Open House in Toronto entitled "Controls on Mineralization at Eagle-Wabigoon Lakes, Dryden", by J. Parker and C.E. Blackburn.

Construction of the Kenora diamond-drill core library, commenced in the fall of 1985, was completed and occupancy taken in February, 1986. The official opening was held on June 20, 1986. By the end of November, staff of the facility had collected 13 500 m of core.

Attendance was made by office staff at annual meetings of the Prospector's and Developers Association, the OGS Geoscience Research Seminar and Open House, and Gold '86, all in Toronto, the annual meeting of the Geological Association of Canada in

Ottawa, and the annual Meeting with Industry of the Geological Services Branch, Manitoba Energy and Mines, in Winnipeg.

Geoscience lectures were provided for Rough Rock and Gelley Lake Junior Ranger Camps of the Ministry of Natural Resources.

MINING ACTIVITY

The joint venture agreement entered into in early 1983 between Union Carbide Exploration Corporation and Consolidated Professor Mines Limited at the Duport Mine, Shoal Lake, gold property of the latter, continued into 1986. Following major underground development in 1984, the workings were allowed to flood, and a limited program of relogging core and sample assaying was conducted by Consolidated Professor Mines Limited in 1985. At the end of 1985, the latter company announced a new reserve calculation of 1.35 million tons at a grade of 0.32 ounce gold per ton.

In early 1986, Consolidated Professor Mines Limited commenced a winter diamond drilling program on the ice at Shoal Lake, to confirm and upgrade zones of inferred mineral reserves, and to test extensions of the deposit to the north, beneath the old shallow workings on Cameron Island, for additional reserves. This work was partly funded by a payment of $500 000 made by Umetco Minerals, the new subsidiary of Union Carbide Corporation, to continue its interest until November 1, 1986, and partly by an OMEP grant. Twenty-six thousand feet of diamond drilling was conducted over 33 holes, 12 of which tested the northern extension of the Main Zone. According to a press release of April 22, 1986, multiple gold-bearing horizons were encountered over a strike length of 850 feet, displaying widths and grades similar to those in the Main Zone. Gold values in the range of 0.20 to 0.90 ounce gold per ton were intersected over widths from 2 feet to 9 feet.

In a press release dated June 25, 1986, Consolidated Professor Mines Limited announced that it had reached an agreement wih Umetco Minerals to regain a 100% interest in the Duport gold property, following a decision by Union Carbide Corporation to divest itself of its world-wide mining interests.

Following announcement of new reserve estimates of 1.51 million tons grading 0.34 ounce gold per ton for an average width of 8.2 feet (The Northern Miner, July 7, 1986), Consolidated Professor Mines Limited announced in a press release dated August 25, 1986 that it had made agreements, including issuance of flow-through shares to Conwest Exploration Company Limited, to provide a minimum of $4.5 million in new financing to undertake an underground program of drifting and diamond drilling, and a surface drilling program at the Duport Property. Mobilization of crews commenced in October and by the end of November underground work had begun (G.R. Cunningham-Dunlop, President, Consolidaolidated Professor Mines Limited, personal communication, 1986).

Following a long period of exploration, commenced in 1981, on its Cameron Lake gold property, Nuinsco Resources Limited announced in a September 19, 1986 press-release that it had reached an agreement with Echo Bay Mines Limited to commence an underground program. Under the terms of the agreement Echo Bay is committed to spend up to $3.6 million in the first phase of driving an exploration ramp, driving drifts and crosscuts, and undertaking diamond drilling, geological mapping, and bulk sampling. Following this initial program, depending on its success, a further underground program would lead to the feasibility stage. Site clearing and preparation commenced in early winter.

QUARRYING ACTIVITY by R.C. Beard

Three dimension stone quarries operated during 1986, two near to Vermilion Bay, and one west of Kenora.

In the Vermilion Bay area, Granite Quarriers (GQI) Incorporated continued to produce large quarry blocks of pink granite for shipping to plants in Canada and the United States.

Also in the Vermilion Bay area, and quarrying from the same granite intrusive as GQI, Nelson Granite Limited produced over 70 000 cubic feet of stone in 1986, an increase over the previous year's production. While most of this quarry product was shipped out as rough blocks as in previous years, some was sawn into slabs before shipping, or fabricated into monuments at the finishing plant at the quarry site. End use of the rough blocks from both the Nelson and the GQI operations was about equally divided between architectural applications and monuments. This year, granite pavers were added to the Nelson Granite Limited product line. The company also opened up a new deposit of grey granite, located near Borup's Corner, between Dryden and Ignace. Initial indications are that this stone will be well suited for monuments and will represent a second basic colour offered by the company from their Vermilion Bay plant.

Rush Bay Quarries Limited continued to produce flagstone on an intermittent basis from its small quarry west of Kenora. This stone is sold largely in southern Manitoba and Northwestern Ontario.

The district's newest ornamental stone product, handled on a commercial basis, is a pure white quartz quarried by Ted Hansen of Kenora from a vein deposit south of Vermilion Bay. This material is crushed and sold in bulk, both as a landscaping stone and for exposed aggregate concrete applications. Some larger blocks are also sold as architectural "accent" pieces.

The Township of Machin (Vermilion Bay), with funding provided by the Ministry of Northern Development and Mines, commissioned a consultant's study to assess the feasibility of establishing a major granite fabricating plant near Vermilion Bay. The report is being brought to the attention of potential investors in the stone and construction industry by the township.

Three undeveloped granite deposits located north of Kenora and previously described by Storey (1986) underwent field exploration, including diamond drilling, by the private sector during the summer (Tables 1.1, 1.2, and 1.3, Numbers 32, 33, 34).

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 1.1

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1986	4,041	5,054	9863	64,099	47,883	9,698	144,837
1985	2,216	5,195	10,875	55,090	185,148	29,765	292,729
1984	3,261	3,042	13,854	36,055	281,359	23,670	364,692
1983	11,061	1,472	13,635	35,746	42,221	12,006	106,397
1982	1,579	1,609	4,046	23,525	26,270	5,330	68,439
1981	2,121	846	4,076	26,127	37,624	3,383	72,732
1980	1,877	788	3,208	15,428	3,149	859	21,368
1979	984	1,357	2,119	9,992	10,658	1,420	24,182
1978	808	1,357	2,300	22,299	7,576	2,143	34,934
1977	1,495	1,585	2,820	15,405	11,366	1,760	33,838
1976	1,380	2,125	3,234	25,030	21,367	5,960	55,042
1975	1,677	2,452	3,975	23,584	31,509	940	57,266
1974	2,653	1,076	4,727	29,496	18,049	3,070	52,134

EXPLORATION ACTIVITY

As in the last few years, the majority of exploration was directed at gold in the Kakagi-Rowan Lakes area, spurred on by the continued work on Nuinsco Resources Limited's Cameron and Rowan Lake Properties. Following a trend set in 1985, exploration for gold was down in the Manitou Lakes, where large blocks of claims formerly held by Teck Corporation and associated joint venture partners, and by GML Resources, came open, and in the Straw Lake area. Other active areas for gold included Dryden, Dinorwic Lake, and Avery Township in the general Eagle-Wabigoon Lakes area, the Fort Frances-Mine Centre area, and northern Lake of the Woods, the latter in particular at the beginning and toward the end of the year when work in Ewart Township and on the Western Peninsula, respectively, led to the discovery of a high-grade gold intersection in drill core.

Exploration for base metals saw somewhat of a resurgence, with at least four companies active, three in the Fort Frances-Mine Centre area, and one in Bridges Township.

Prospecting for platinum was conducted by numerous individuals and companies sampling mafic to ultramafic intrusions.

GOLD

Kakagi–Rowan Lakes Area

Nuinsco Resources Limited continued to expand its exploration program at Cameron and Rowan Lakes in 1986, following the renewed optimism generated by its agreement with Echo Bay Mines Limited early in 1985. Toward the end of 1985, Nuinsco entered into agreements with a number of companies holding ground in the general area, expanding their effort into the Dogpaw Lake area. These deals included the following: an option on 19 claims owned by Tantalus Resources Limited, and the outright purchase of 16 claims adjacent to the west boundary of the Tantalus Property, from Calaveras Explorations Limited; and option agreements with First General Mine Management and Gold Corporation and with Micham Exploration Incorporated, on their adjoining properties at Dogpaw Lake. The latter properties include the Gauthier Occurrence at Dogpaw Lake, and the Flint Lake Mine Occurrence on the north shore of Flint Lake. Diamond drilling was conducted on both these properties early in 1986. A short hole (160 feet) drilled beneath the Gauthier Occurrence reportedly encountered weak silicification of felsic tuffs, with finely disseminated pyrite (Assessment Files, Resident Geologist's Office, Ontario Ministry of Northern Development and Mines, Kenora). No gold assays are reported, and results were discouraging (George Archibald, Vice President, Nuinsco Resources Limited, personal communication, 1986).

The deals with Tantalus and Calaveras enabled Nuinsco, in conjunction with Silver Lake Resources Incorporated, who entered into a joint venture agreement with Del Norte Chrome Corporation on the latter's ground, between the Tantalus Property and Nuinsco's Monte Cristo Property, to proceed with a winter program of reverse circulation overburden drilling beneath Sullivan Bay of Rowan Lake, along the projected extension of the Monte Cristo shear zone. This drilling program identified new diamond drill targets, that were subsequently drilled by both Nuinsco and Silver Lake.

Diamond drilling was also conducted on the Victor Zone of the Monte Cristo Property, subsequent to an announcement (The Northern Miner, February 10, 1986) of a 10 000-foot program.

Nucanolan Resources Limited, formerly Canolan Resources, on its 34-claim property between Nuinsco's ground at Cameron Lake and Sullivan Bay of Rowan Lake, conducted geological work, and overburden drilling, under an option agreement with Echo Bay Mines Limited. Two hundred holes were drilled in total, using hydraulic and vibrating drills, and a magnetometer survey was run over the southern portion of the claim group (Assessment Files, Resident Ge-

TABLE 1.2: MAPS AND REPORTS PERTAINING TO THE KENORA RESIDENT GEOLOGIST'S AREA

Open File Reports
OFR 5470
OFR 5544
OFR 5570
OFR 5572
OFR 5592
OFR 5629

Preliminary Maps - Geological Series
P.2843
P.2966
P.2967

Mineral Deposits Circular
MDC 27

Miscellaneous Papers
MP 128
MP 129
MP 130
MP 131
MP 132

Geological Data Inventory Folios
GDIF 284
GDIF 313
GDIF 314
GDIF 320
GDIF 321
GDIF 322

Open File Map
OFM 33
OFM 36
OFM 42
OFM 49
OFM 52
OFM 54
OFM 60
OFM 64

ologist's Office, Kenora; results from three holes submitted only).

Other work carried out in the vicinity of Nuinsco's Rowan Lake Properties was done by Bigstone Minerals Limited, D.K. Platinum Corporation, and Falconbridge Limited.

Bigstone Minerals Limited, in a joint venture with Anglo Canadian Mining Corporation, subsequent to the discovery of visible gold at surface in a quartz vein in a shear zone parallel to the Monte Cristo shear zone, which had led to the diamond drilling of eleven holes in 1984, carried out further diamond drilling in January and February, 1986. In the new program, fifteen holes were drilled, totalling 3589 feet, to test eight quartz-carbonate zones previously identified by surface mapping and trenching (Assessment Files, Resident Geologist's Office, Kenora). Most of the zones were found to be barren upon assay of samples from the drill program and only one zone returned assays better than trace amounts.

D.K. Platinum Corporation, also in a joint venture with Anglo Canadian Mining Corporation, undertook a ground electromagnetic and magnetic survey performed by Chester Kuryliw on claims south of Nuinsco's Monte Cristo Property (Assessment Files, Resident Geologist's Office, Ministry of Northern Development and Mines, Kenora).

Falconbridge Limited diamond drilled over the midwinter of 1985/86, eight holes on their Wampum gold occurrence at the east end of Rowan Lake, subsequent to a rock sampling and assay program in 1984 (Assessment Files, Resident Geologist's Office, Kenora). Elsewhere, in the general Kakagi-Rowan Lakes greenstone belt, a number of companies continued exploration commenced in previous years. Three of these, southwest of the Pipestone-Cameron Fault, Dunfrazier Gold Explorations Incorporated, Proteus Resources Incorporated, and Wasabi Resources Limited, were situated close to the transition zone between Snake Bay mafic volcanic rocks, and overlying Kakagi Lake calc-alkaline volcanic rocks, recommended as a good zone for exploration for gold by Blackburn and Janes (1983).

Dunfrazier Gold Explorations Incorporated, following geological survey and diamond drilling in 1985 on their Bag Lake gold occurrence property in the Dogpaw Lake area, conducted a magnetometer survey in early 1986, followed by diamond drilling in the fall. The ten-hole, 3920-foot diamond drill program of November and December, 1985, was conducted on three zones, one at Bag Lake previously identified as the Knapp Occurrence, and two new zones along the new road from Highway 71 into the Nuinsco Resources Limited Property at Cameron Lake. One of the new zones was interpreted to follow a north-northeasterly trending lineament that would parallel volcanic stratigraphy as outlined by Davies and Morin (1976). To date, only geochemically anomalous gold values have been reported from rock samples taken along the lineament (Assessment Files, Resident Geologist's Office, Ministry of Northern Development and Mines, Kenora).

Proteus Resources Incorporated conducted follow-up diamond drilling of 5500 feet over 14 holes on their 57-claim property at the north end of Emm Bay, Kakagi Lake, following geological mapping, trenching, and assaying of samples in 1985. Reported gold assays from 13 of the holes are mostly in the trace range, but ran up to 0.10 ounce per ton, with one sample assaying 2.68 ounces per ton over a one foot core length (Assessment Files, Resident Geologist's Office, Ministry of Northern Development and Mines, Kenora).

Wasabi Resources Limited contracted Terraquest Limited to carry out an airborne electomagnetic and magnetic survey over their Phillips Township option on the Combined Prospect. Previous work reported by the company had consisted of ground electromagnetic and magnetic surveys and diamond drilling, all in 1984 (Assessment Files, Resident Geologist's Office, Kenora).

Canadian Nickel Company Limited conducted work on two properties in the general Kakagi-Rowan

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 1.3

Number on Figure	Individual or Company	Activity
1	Baranes, Bruce	Geophysical Survey, Bluffpoint Lake Area
2	Bigstone Minerals Ltd.	Geophysical Survey and Diamond Drilling, Rowan Lake Area
3	Bisset, John (Pleno Mines)	Geophysical Survey, Brooks Lake Area
4	Canadian Nickel Company Limited	Geological Survey, Code Township
5	Canadian Nickel Company Limited	Geophysical Survey, Atikwa Lake Area
6	Canadian Nickel Company Limited	Diamond Drilling, Heronry Lake Area
7	Consolidated Silver Standard Mines	Geophysical Survey, Bluffpoint Lake Area
8	Corporation Falconbridge Copper	Diamond Drilling, Bad Vermilion Lake Area
9	Corporation Falconbridge Copper	Diamond Drilling, Bliss Lake Area
10	Cousineau, Louis	Stripping, Halkirk Township
11	D.K. Platinum Corporation Ltd.	Geophysical Surveys, Rowan Lake Area
12	Doal, D.R.	Geophysical Survey, Dogpaw Lake Area
13	Dunfrazier Gold Exploration Inc.	Geological and Geochemical Surveys, Dogpaw Lake Area
14	Esso Resources Canada	Geophysical Survey, Boyer Lake Area
15	FGM Management and Gold Corp.	Diamond Drilling, Dogpaw Lake Area
16	Falconbridge Limited	Diamond Drilling, Rowan Lake Area
17	Federal Kirkland Mines Ltd.	Geophysical Surveys, Little Turtle Lake Area
18	Hall, Evald Monty	Stripping, Boyer Lake Area
19	Hansen, J.E. Golden Rule Resources	Geological Survey, Shoal Lake Area
20	Hoban, Michael J.	Stripping, Aubrey Township
21	Hood, William C.	Geological Survey, Jaffray Township
22	Karawacki, John	Stripping, Haycock Township
23	Kasner, R.J.	Airborne Geophysical Surveys, Turtlepond Lake Area
24	Kidd Creek Mines Ltd.	Geophysical Survey and Diamond Drilling, Watten Township
25	Kidd Creek Mines Ltd.	Geophysical Survey and Manual Work, Aubrey Township and Contact Bay Area
26	Kozowy, Alexander Silver Lake Resources	Manual Work and Diamond Drilling, Kawashegamuk Lake Area
27	Kroocmo, David	Trenching, Factor Lake Area
28	LaFleche, Gerald	Geological and Geophysical Surveys,Dogpaw Lake Area
29	McCormick, Alan	Geophysical Survey, Bad Vermilion Lake Area
30	Mistango Consolidated Resources Ltd.	Diamond Drilling, Garnet Bay Area
31	Mountain Lake Resources Inc.	Stripping, Wiley Bay Area
32	Nault, Pierre	Diamond Drilling, Haycock Township
33	Nault, Pierre	Diamond Drilling, Swan Lake Area
34	Nault, Pierre	Diamond Drilling, Wonderland Lake Area
35	Nelson, Carter	Stripping and Trenching and Mechanical Work, Docker Township
36	Noranda Exploration Co. Ltd.	Geological, Geochemical and Geophysical Surveys and Stripping, Avery Township
37	Noranda Exploration Co. Ltd.	Geophysical Survey, Boyer Lake Area
38	Nucanolan Resources Ltd.	Geological Survey and Overburden Drilling, Rowan Lake Area
39	Nuinsco Resources Ltd.	Overburden Drilling and Diamond Drilling, Rowan Lake Area
40	Prophet Resources Ltd.	Geological and Geochemical Surveys, Boyer Lake Area
41	Proteus Resources Inc.	Diamond Drilling, Dogpaw Lake Area
42	Redden, J.W.	Consultant's Report, Line Lake Area
43	Rio Algom Exploration Inc.	Diamond Drilling, Bridges Township
44	Roberecki, Joel	Manual Work and Stripping, Ewart Township
45	Rosenthal, Alex	Diamond Drilling, Rowan Lake Area
46	Soteropolos, Theodore	Geological Survey, Rowan Lake Area
47	Sovereign, William John	Mechanical Work, Turtlepond Lake Area
48	Steep Rock Resources Inc.	Geophysical Survey, Bad Vermilion Lake
49	Wasabi Resources Ltd.	Airborne Geophysical Survey, Phillips Township

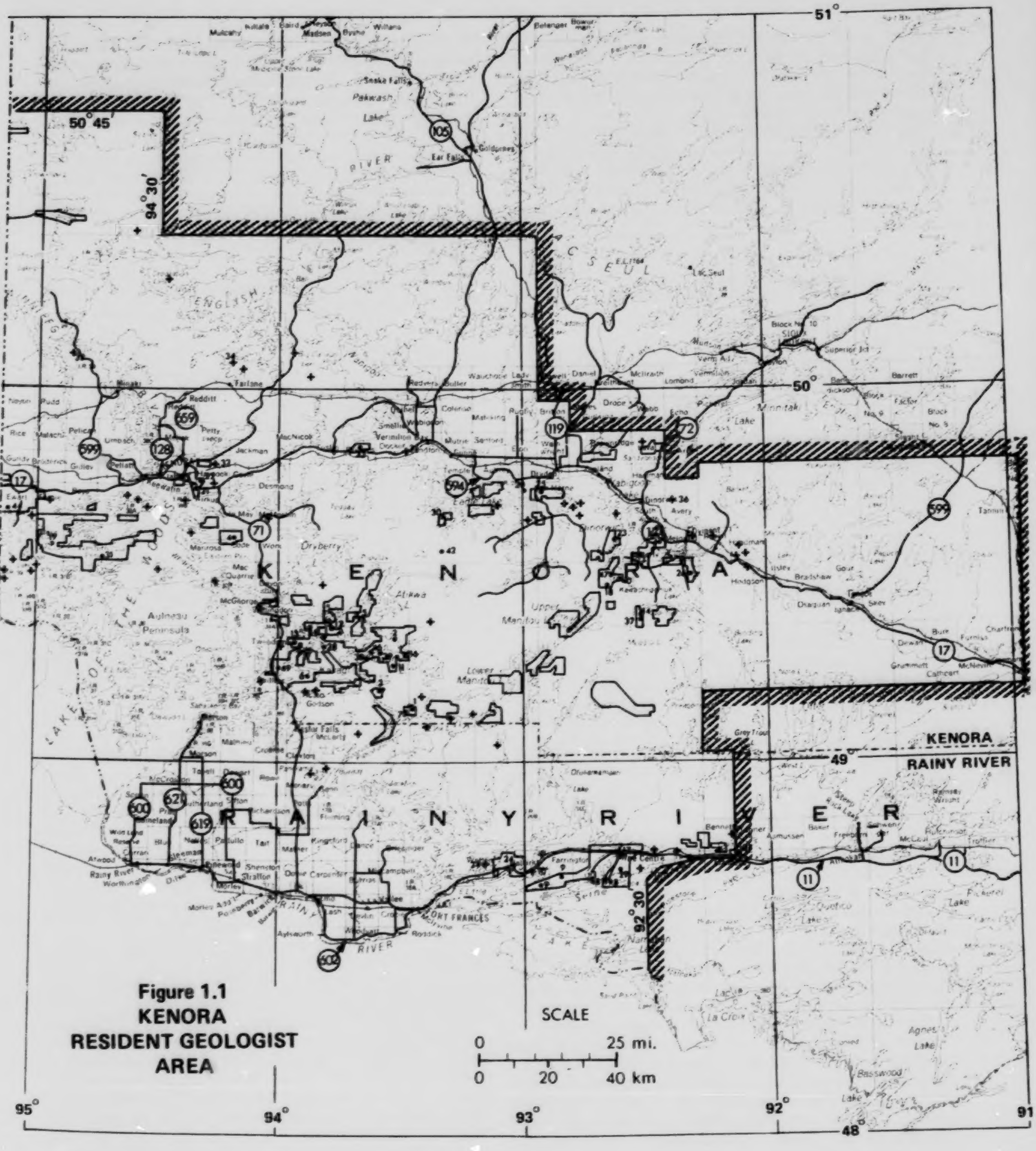

MANITOBA
KENORA
RAINY RIVER
50°45'
94°30'
51°
50°
49°
48°
92°30'
95°
94°
93°
92°
91
SCALE
0
25 mi.
0
20
40 km
Red Lake
Ear Falls
Sioux Lookout
Kenora
Dryden
Fort Frances
Rainy River
Lake of the Woods
English River
Lac Seul

Figure 1.1
KENORA
RESIDENT GEOLOGIST
AREA

EXPLANATION

- • Exploration Activities in 1986 (keyed to table 1.3)
- + Isolated active claim blocks as of Dec 1, 1986

Extent of contiguous staking to Dec 1, 1986 (may include patented claims in areas of intense staking)

Boundary of Resident Geologist's Area

Lakes area in 1986, consisting of electromagnetic and magnetic surveys on ground held along the Atikwa River, northeast of the Virginia gold occurrence in the Atikwa Lake area, and diamond drilling at the Penn gold occurrence on Kakagi Lake, in the Heronry Lake area (Assessment Files, Resident Geologist's Office, Kenora). The former work was conducted in a joint venture with Fort Knox Gold Resources Incorporated, and the latter is part of a continuing program under an agreement with Welcome North Mines Limited.

Consolidated Silver Standard Mines Limited conducted work on two properties: 1) in Wellingdon Township, on the Gaudry Prospect on the north shore of Regina Bay, where eight holes were diamond drilled in midwinter of 1985 to 1986, three on the main shear, and five to test geophysical and geological targets north of the main shear (George Cross News Letter, February 12); 2) in the Bluffpoint Lake area, electromagnetic and magnetic surveys were conducted at Pipestone Lake which outlined conductive zones parallel to the Pipestone-Cameron Fault.

Other exploration work includes: in the Rowan Lake area, diamond drilling by A. Rosenthal, and geological mapping for T. Soteroplos; in the Dogpaw Lake area, geophysical surveys by D. Doal, and geophysical and geological surveys by G. Lafleche; in the Brooks Lake area, geophysical surveys by J. Bissett; and in the Bluffpoint Lake area, geophysical surveys by B. Baranes.

Manitou–Wabigoon–Eagle Lakes Area

Mistango Consolidated Resources Limited drilled two holes totalling 152.4 m (500 feet), during early 1986, at the Eldorado Prospect on Eagle Lake, in the Garnet Bay area. The drillholes were targeted on gold-bearing quartz veins within sheared granitic rocks of the Atikwa Batholith, where in the past assays up to 0.47 ounce gold per ton had been reported. However, no significant gold values were intersected. The Eldorado Prospect is one of a number of gold occurrences held by Mistango in the Eagle Lake area since 1982 (Assessment Files, Resident Geologist's Office, Kenora).

International Platinum Corporation (formerly Silver Lake Resources Incorporated) drilled six holes totalling approximately 731.5 m (2400 feet) at the Morning Star Occurrence on the northeast shore of Eagle Lake. Five of the holes intersected coarse, visible gold in two narrow quartz veins over a strike length of 137.2 m (450 feet) and to a depth of 121.9 m (400 feet). Initial assays indicate a rich zone grading 1.0 ounce gold per ton to 1.4 ounces gold per ton over average widths of about 15 cm (0.6 feet) (The Northern Miner, December 8, 1986). The Morning Star Occurrence consists of boudinaged, gold-bearing quartz veins within sheared and carbonatized mafic metavolcanic rocks immediately south of the Wabigoon Fault.

Kidd Creek Mines Limited conducted ground electromagnetic and magnetic surveys and sampling during 1985 and early 1986, in Aubrey Township and the Contact Bay area, on the Flambeau Lake Prospect, previously optioned to Voyager Explorations Limited who had conducted extensive work, including drilling, during 1984 (Assessment Files, Resident Geologist's Office, Kenora). Extensive stripping and sampling done by Kidd Creek Mines Limited in 1985 indicated numerous tension fracture-hosted gold-bearing quartz veins concentrated in quartz diorite and gabbro/diorite intrusions. Falconbridge Limited assumed the option on the property in 1986, following their takeover of Kidd Creek Mines Limited. Falconbridge acquired more ground, east of the Flambeau Lake Prospect, which includes some new gold discoveries and a number of old trenches and test pits. During the summer of 1986, Falconbridge conducted stripping, trenching, sampling, mapping, and geophysical surveys at Flambeau Lake.

R.J. Kasner contracted airborne electromagnetic, resistivity, and magnetic surveys over approximately 300 contiguous claims in the Tabor Lake area and Satterly Township, east of Dinorwic Lake, and over 42 contiguous claims in the Turtlepond Lake area, near the Van Houten Prospect, west of Dinorwic Lake (Assessment Files, Resident Geologist's Office, Kenora).

Noranda Exploration Company Limited performed ground magnetic and electromagnetic surveys, geological mapping, stripping, and sampling on the Pidgeon-Avery Township Occurrence, in Avery Township, during the summer of 1986. The property consists of gold mineralization hosted by carbonatized, pyritic, silicified zones within a wide northeast-trending shear zone (Assessment Files, Resident Geologist's Office, Kenora).

Novamin Resources Incorporated (formerly known as Sulpetro Minerals Limited), in a joint venture deal with Troymin Resources Limited (Northern Miner, March 10, 1986), diamond drilled five holes totalling 546.5 m (1793 feet) on the Tabor Lake and Glatz Occurrences in the Tabor Lake area and Melgund Township respectively, during late 1985. A hole drilled at the Tabor Lake Occurrence intersected 0.118 ounce gold per ton over 0.3 m (1 foot), while a hole targeted on a feldspar-porphyry dike hosting numerous quartz veins containing disseminated pyrite and galena (Assessment Files, Resident Geologist's Office, Kenora), intersected a 7.3 m (24 feet) section assaying 0.07 ounce gold per ton, including an intersection of 0.915 ounce gold per ton over 0.39 m (1.3 feet) (The Northern Miner, December 30, 1985).

Silver Lake Resources Incorporated (presently International Platinum Corporation) drilled five holes totalling 849 m (2786 feet) on the New Church Lake Occurrence, located on the eastern shore of Church Lake, in the Kawashegamuk Lake area. The drill program was designed to test a magnetic anomaly coincident with a zone of auriferous tallus and a gold-bearing quartz vein. The drilling confirmed the presence of a traceable gold-bearing sulphide zone and quartz vein within sheared quartz gabbro. The best intersections were 0.05 ounce gold per ton across 5 m (16.5 feet), including a 0.9 m (3 feet) section assaying 0.108 ounce gold per ton, and 0.02 ounce gold per ton over 0.9 m (3.1 feet), including 0.15 m (0.5 foot) of 0.079 ounce gold per ton (Assessment Files, Resident Geologist's Office, Kenora).

Esso Resources Canada Limited, in a joint venture agreement with Billikin Resources Incorporated, resumed exploration at their Snake Bay Prospect, in the Kawashegamuk Lake area, during the spring of 1986. Esso diamond drilled ten holes totalling 843 m (2763 foot) on three of seven known gold showings on their property. Significant gold values, such as 0.5 ounce gold per ton over 0.54 m (1.8 feet), 0.26 ounce gold per ton over 0.51 m (1.7 feet), and 0.14 ounce gold per ton over 0.85 m (2.79 feet) and 0.79 m (2.59 feet), were intersected in three holes targeted on the Twilight Zone, a 2 m (6.5 feet) to 5 m (16.4 feet) wide carbonate vein zone cutting a variably brecciated and silicified gabbroic sill (George Cross News Letter, September 13, 1986). Esso also conducted a ground magnetic survey on their portion of the Pelham Prospect located west of Washeibemaga Lake, in the Boyer Lake area (Assessment Files, Resident Geologist's Office, Kenora).

Noranda Exploration Company Limited also conducted a magnetic survey on their portion of the Pelham Prospect (Assessment Files, Resident Geologist's Office, Kenora).

Following a protracted exploration program on their claims in the Lower Manitou, Harper, and Boyer Lakes areas during 1984 and 1985, Cochrane Oil and Gas Limited was inactive on their property in 1986. However, the company did report that gold values up to 0.03 ounce gold per ton were found to occur across a 50 m (164 feet) wide zone of pyritic quartz-sericite schist containing numerous carbonate lenses and banded, cherty, iron formations. A second 25 m (82 feet) wide zone of carbonaceous alteration in metasediments was reported to have returned gold values that the company judged to warrant further work (George Cross News Letter, January 21, 1986).

St. Joe Canada Incorporated diamond drilled seventeen holes totalling 899 m (2950 feet) in the vicinity of Frenchman Island, on Upper Manitou Lake, in the Harper Lake and Lower Manitou Lake areas during late 1985, however, no work was done during 1986. Most of the holes intersected anomalous gold values ranging between trace to 0.08 ounce gold per ton. A hole drilled in the vicinity of Bird Island, situated immediately southwest of Frenchman Island, intersected 0.20 ounce gold per ton across 1.5 m (5 feet) in a pyritic, rhyodacitic to dioritic, pyroclastic rock. Another hole drilled at the north end of North Island, south of Frenchman Island, intersected 0.16 ounce gold per ton across 1.5 m (5 feet) in sheared metavolcanics hosting pyritic quartz stringers (Assessment Files, Resident Geologist's Office, Kenora).

Other persons and companies known to have done exploration for gold in the general Manitou-Wabigoon-Eagle Lakes area in 1986 include: stripping by M.J. Hoban in Aubrey Township; sampling by W.J. Sovereign in the Turtlepond Lake area; and stripping by E.M. Hall in the Boyer Lake area.

Lake of the Woods–Shoal Lake Area

Calnor Resources Limited, in a drilling program on their option on patented claims at High Lake, Ewart Township, that included the old Electrum Lake gold prospect, reported gold intersections that resulted in a minor staking rush between the Trans Canada Highway to the north and Shoal Lake to the south. The program was designed to test anomalies previously outlined by geophysical and humic geochemical surveys, in areas previously not tested for gold potential. Hole number 6 reportedly (The Northern Miner, February 17, 1986) intersected 22 feet grading 1.60 ounces gold per ton, and number 13 (The Northern Miner, March 10, 1986) intersected 11 feet grading 0.84 ounce gold per ton. Twenty-two holes were drilled, for a total of 7594 feet (George Cross News Letter, April 23, 1986), mostly on the number 1 anomaly, first intersected in hole number 6, and also in number 13. Consultant geologist J. Dawson estimated this gold-bearing zone to be at least 1100 feet long. Gold is associated with diseminated pyrite in sheared quartz-feldspar porphyry of the High Lake Stock.

St. Joe Canada Incorporated conducted exploration on patented ground under an option agreement with Kenora Prospectors and Miners, on their ground in the Shoal Lake area that includes the past-producing Mikado and Cedar Island (Cornucopia) Mines, among other gold prospects. According to an article in The Northern Miner, April 21, 34 holes totalling 11 500 feet were diamond drilled in early 1986. A second program commenced in late 1986.

Boise Cascade Canada, in an agreement with Madeleine Mines Limited, continued diamond drilling on their wholly owned Scramble Prospect in Jaffray Township. In a previous round of exploration, drilling had been conducted in 1985 under an agreement with Kennco Explorations (Canada) Limited.

Mountain Lake Resources Incorporated conducted an exploration program on the Gold Mountain Prospect, situated on Western Peninsula of Lake of the Woods, in the Wiley Bay area, acquired under an option agreement on four unpatented claims. Gold values had previously been recorded in drilling by C. Kuryliw in 1973, and Cominco Limited in 1977. Following extensive stripping, chip samples were taken in the vicinity of the former shallow shaft (Assessment Files, Resident Geologist's Office, Kenora). Considerable staking activity ensued on Western Peninsula subsequent to the initial work by Mountain Lake Resources, and by the end of October, in excess of 500 claims had been recorded. In a related program, Midnapore (1979) Resources Incorporated reported results obtained from diamond drilling conducted on a new gold occurrence near Crow Rock Island in the Wiley Bay area, Lake of the Woods. Midnapore reported (The Northern Miner, November 24, 1986) that the third hole of a four-hole program "intersected 8 feet grading 7.694 oz. gold per ton . . . True width is estimated to be about 6 ft." This drilling was carried out as follow-up to an assay obtained from a chip sample taken by an Ontario Geological Survey field crew. The fourth hole of the program was drilled beneath the old Cronlund gold occurrence, about 1.5 miles to the west of the new showing.

Canadian Nickel Company Limited, as part of a larger exploration program in Lake of the Woods, conducted geologic mapping on a claim group in Code Township, just west of the past-producing Wendigo Mine. A 100 m wide shear zone straddling the contact between mafic volcanic rocks and overlying intermediate tuffs was found to host rare pyritic zones with weakly anomalous gold values (Assessment Files, Resident Geologist's Office, Kenora).

President Mines Limited announced in October (George Cross News Letter, October 27, 1986) that the old Triumph shaft, on their ground in Haycock Township, was currently being dewatered and rehabilitated for further exploration.

Other work done includes: in Shoal Lake area, a summary report by J. Hansen for Golden Rule Resources Limited on geological mapping conducted in 1985 on a number of gold occurrences within and marginal to the Canoe Lake Stock; in Jaffray Township, geological mapping by W.C. Hood; in Haycock Township, stripping by J. Karwacki; and in Ewart Township, stripping by J. Roberecki.

Mine Centre Area

Corporation Falconbridge Copper drilled four more holes (453 m) for a total of thirteen holes (1 189.6 m) at the McKenzie-Gray gold and base metal occurrence optioned from S. Lakatos and K. McTavish (G. Wells, geologist, Corporation Falconbridge Copper Limited, 1986, personal communication). Stripping at this property has revealed a mylonite zone which may be the Finger Bay Fault. Steep Rock Resources Limited carried out magnetic and electromagnetic surveys over seventeen claims situated immediately west of the McKenzie-Gray Occurrence, where potential exists for both gold and base metals. The magnetic data indicates a series of discontinuous highs and lows, interpreted to be the Finger Bay Fault (Assessment Files, Resident Geologist's Office, Kenora).

HSK Minerals, formerly Homestake Explorations Limited, has brought six claims to lease covering the old Olive Mine and surrounding area. The property is currently under option to Noront Resources, under whom a surface bulk sampling program which averaged 2.75 ounces gold per ton, was carried out by E. Ludwig during the summer with a 4 ton per day mill (C.E. Page, geologist, HSK Minerals, personal communication, 1986). Noront has committed to spend $250 000 during the first two years to earn a 30% interest in the property (Northern Miner, June 30, 1986).

Orofino Resources Limited conducted geophysical and humic geochemical surveys on a portion of a block of 128 claims covering the Shoal Lake area and the Seine River Fault, optioned from Prospectors of Canada, a local prospecting syndicate. The bulk of the claim block is to be covered with ground geophysical surveys over the winter of 1986 to 1987 (F. Manns, Senior Geologist, Orofino, 1986, personal communication).

Other activity known to have been carried out for gold in the Mine Centre area during 1986 include: stripping by L. Cousineau in Halkirk Township; electromagnetic and magnetic surveys by Federal Kirkland Mines Limited in Little Turtle Lake area; and trenching by D. Kroocmo in the Factor Lake area.

BASE METALS

Rio Algom Exploration Incorporated continued its exploration for base metals and conducted a nine hole diamond drilling program during 1986 to follow-up on targets selected from geological and geophysical surveys performed during 1985. The property consists of 54 contiguous claims located immediately north of the Trans-Canada Highway in central Bridges Township. Drillholes intersected disseminated sulphides in amphibolite grade metasediments and metavolcanics. Previous work on the property in 1969 by Noranda Mines Limited consisted of geophysical surveys and diamond drilling (Assessment Files, Resident Geologist's Office, Kenora).

Corporation Falconbridge Copper continued its extensive base metal program at Swell Bay with geological, lithogeochemical, and geophysical surveys and a 20-hole diamond drill program (Frank Balint, geologist Falconbridge Copper Limited, personal communication, 1986).

Kidd Creek Mines Limited carried out electromagnetic and magnetic surveys followed by diamond drilling on ground optioned from L. Cousineau, in Halkirk and Watten Townships.

PLATINUM

Most exploration for platinum was conducted on a reconnaissance or prospecting basis, within known mafic to ultramafic intrusions. In particular, the Mulcahy Lake intrusion attracted attention. Equinox Resources Limited, as part of a Canada-wide program (George Cross News Letter, April 22, 1986) conducted a sampling program on claims within it.

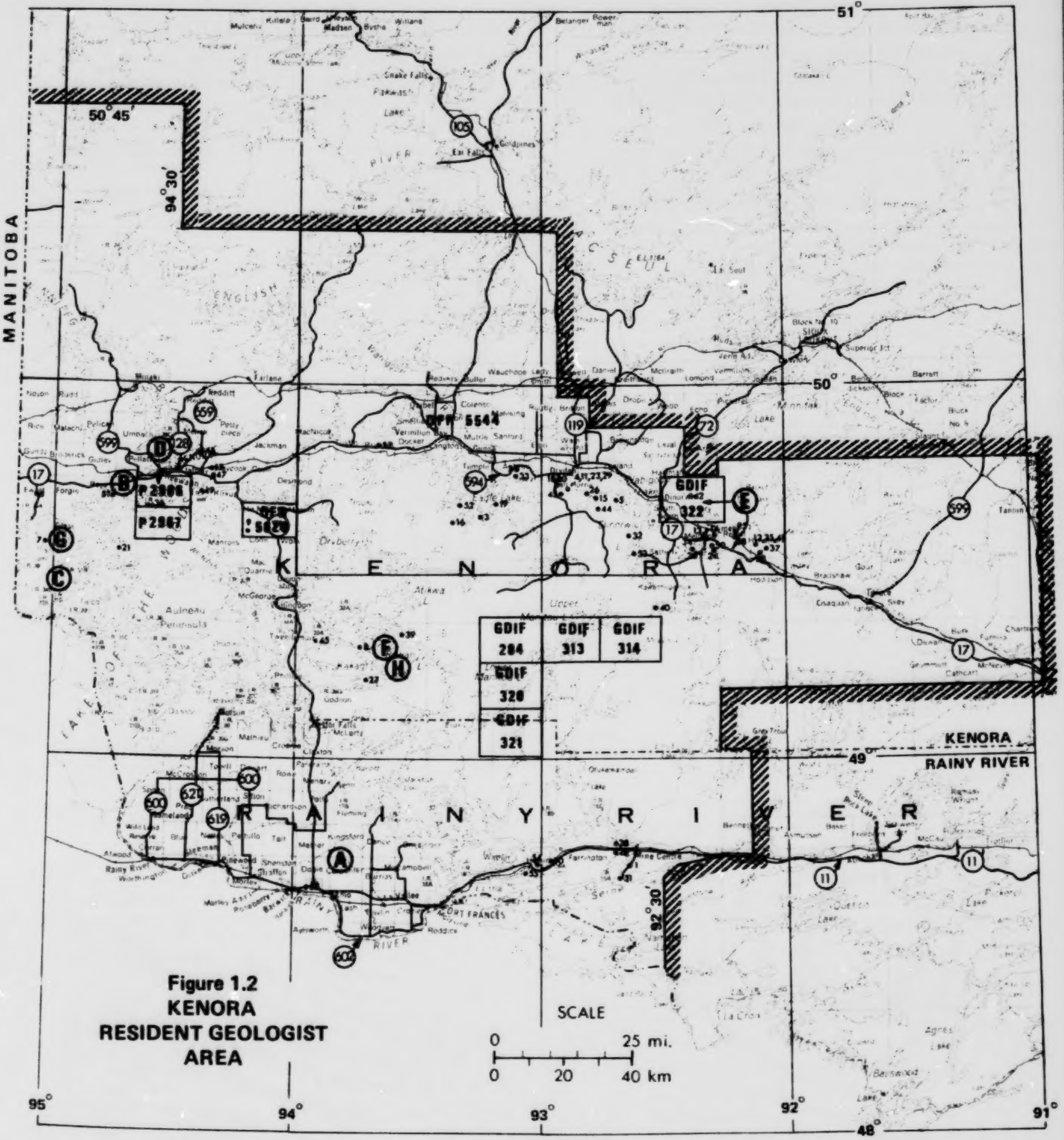
During the fall, a block of in excess of 600 claims was staked over the entire Entwine Lake Intrusion for BP Resources Canada Limited. Diamond drilling has been conducted in the past by Noranda Exploration Company Limited on copper-bearing sulphide zones at the edge of the intrusion.

PROPERTY EXAMINATIONS

In 1986, the following mining and exploration properties, and mineral occurrences and prospects were examined by staff of the Kenora Resident Geologist's Office. Their location is illustrated in Figure 1.2.

GOLD:

1. AL 104, AL 105, and AL 106 Claims—Bad Vermilion Lake area
2. A.S. 16 Occurrence or Aubrey Lake Occurrence—Aubrey Township
3. Baden-Powell Mine—Buchan Bay area
4. Bonanza and Redeemer Mines—Van Horne Township
5. Butler Lake Occurrence—Butler Lake area
6. Calnor Electrum Lake Occurrence—Ewart Township
7. Cameron Island Mine (Duport Mine)—Snowshoe Bay area
8. Cameron Lake (Nuinsco) Prospect—Rowan Lake area
9. Canico Witch Bay Occurrence—Code Township


MANITOBA
KENORA
RAINY RIVER
ENGLISH RIVER
LAC SEUL
LAKE OF THE WOODS
Aulneau Peninsula
Sioux Lookout
FORT FRANCES
GDIF 284
GDIF 313
GDIF 314
GDIF 320
GDIF 321
GDIF 322
OFR 5544
OFR 5620
P 2986
P 2987
A
B
C
D
E
F
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H
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11
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502
594
599
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92°30′
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SCALE
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40 km

Figure 1.2
KENORA
RESIDENT GEOLOGIST
AREA

EXPLANATION

GDIF 314 Map or Report issued by Ontario Geological Survey, 1986 (keyed to Table 1.2)

Ⓐ Location of OGS Field Party and/or Special Project, 1986 (keyed to text)

•13 Property visits, Resident Geologist Office (keyed to table found in text)

▨ Boundary of Resident Geologist's Area

10. Cousineau Claims—Halkirk Township
11. Drake Prospect—Van Horne Township
12. Dumond Prospect—Hyndman Township
13. E 161 Occurrence—Melgund Township
14. E 163 Occurrence—Melgund Township
15. EDB-1 Occurrence—Contact Bay area
16. Eldorado and Grace Prospects—Garnet Bay area
17. Eschweiler Occurrence—Jaffray Township
18. Flambeau Lake Prospect—Aubrey and Van Horne Townships
19. Fornieri Bay and W.W. Smith Prospect—Buchan Bay area
20. Glatz West Zone Occurrence and Pathfinder Prospect—Melgund Township
21. Gold Mountain Prospect—Wiley Bay area
22. Gold Quartz Mining Company Occurrence or V33 Occurrence—Hyndman Township
23. Golden Moose Occurrence—Van Horne Township
24. H.W. 486 Occurrence—Melgund Township
25. H.W. 611, H.W. 642, H.W. 673 Occurrences—Revell Township
26. Johnson-Contact Bay Occurrence—Contact Bay area
27. Kakagi Lake (East Group) Occurrences—Brooks Lake area
28. Lady Marion Occurrence or H.W. 525 Occurrence—Revell Township
29. Little Jumbo Prospect—Van Horne Township
30. Lone Jack Occurrence—Van Horne Township
31. McKenzie-Gray Occurrence—Bad Vermilion Lake area
32. Moose Bay and K812786 Occurrence and Van Houten Prospect—Turtlepond Lake area.
33. Morning Star Occurrence—Buchan Bay area
34. New Klondike Prospect—Melgund Township
35. No. 3 Vein Occurrence—Hyndman Township
36. Nor-Pen Occurrence—Clearwater Bay area
37. Old Showing—Hyndman Township
38. Olive Mine—Little Turtle Lake area
39. Patmour Occurrence—Rowan Lake area
40. Pelham Prospect—Boyer Lake area
41. Pidgeon Occurrence—Hyndman Township
42. Pidgeon-Avery Township Occurrence—Avery Township
43. Pidgeon-Bob Lake Occurrence—Contact Bay area
44. Pidgeon-Trap Lake Occurrence—Contact Bay area
45. Proteus Resources Claims—Dogpaw Lake area
46. Scramble Prospect—Jaffray Township
47. Silverman and Roseman Occurrences—Jaffray and Haycock Townships
48. Stellar Prospect—Bad Vermilion Lake area
49. Sultana Mine—Bigstone Bay area
50. S.V. 210 and S.V. 211 Occurrences—Melgund Township
51. Three Friends Occurrence—Boys Township
52. Viking Prospect—Garnet Bay area
53. Whitewater Lake Occurrence—Turtlepond Lake area

COPPER-NICKEL

54. Bellacoma Mines Ltd. Prospect—Halkirk Township
55. Northrock Mine—Watten and Halkirk Townships
56. Young-Corrigan Prospect—Doble Township

COPPER-ZINC

57. Bridges Township Occurrence—Bridges Township

RECOMMENDATIONS FOR EXPLORATION

GOLD

Eagle–Wabigoon Lakes by J. Parker

There are over 40 known gold occurrences in the Eagle-Wabigoon Lakes area south of Dryden. Controls on gold emplacement have not been well documented or understood. Recent studies in the area (Parker 1985) have shown that gold-bearing quartz veins are dominantly controlled by structure and stratigraphy (Figure 1.3).

Structural Control

Recent detailed mapping, at a scale of 1:4800 (1 inch to 400 feet) of the Flambeau Lake-Larson Bay area (Figure 1.4), situated immediately west of Wabigoon Lake, has shown that gold-bearing quartz veins are controlled by northwest-trending tension fractures and east-trending shear zones. This pattern can be observed throughout the Eagle-Wabigoon Lakes in general.

The location of most gold occurrences can be spatially and genetically related to major movement along the Wabigoon Fault. A major component of movement along the fault, at the English River-Wabigoon Subprovincial boundary can be shown to be dominantly dextral, based on major and minor tectonic structures.

At Wabigoon and Eagle Lakes numerous subparallel to parallel linear shear zones hosting gold-bearing quartz veins are subparallel to the Wabigoon Fault. Dominant east-trending shearing in the vicinity of Larson Bay of Wabigoon Lake controls all gold-bearing quartz veins, including veins at the Bonanza (Figure 1.3, Number 2 and Figure 1.4) and Redeemer (Figure 1.3, Number 10 and Figure 1.4) Mines, and felsic quartz-feldspar porphyry and felsite dikes. At Eagle Lake, linear shear zones striking 040° to 060° occur within granitic rocks along the northern contact of the Atikwa Batholith in an area where the Wabigoon Fault is northeast-trending. The fact that the majority of shear zones at Eagle and Wabigoon Lakes are subparallel to the Wabigoon Fault suggests that they are secondary shear bands developed subparallel to the shear boundaries of the fault. Shearing is widespread and variable in orientation and intensity throughout the metavolcanic rocks around Eagle Lake. Commonly, shearing is subparallel to the general boundaries of the main intrusive masses, indicating that they acted as buttresses during deformation.

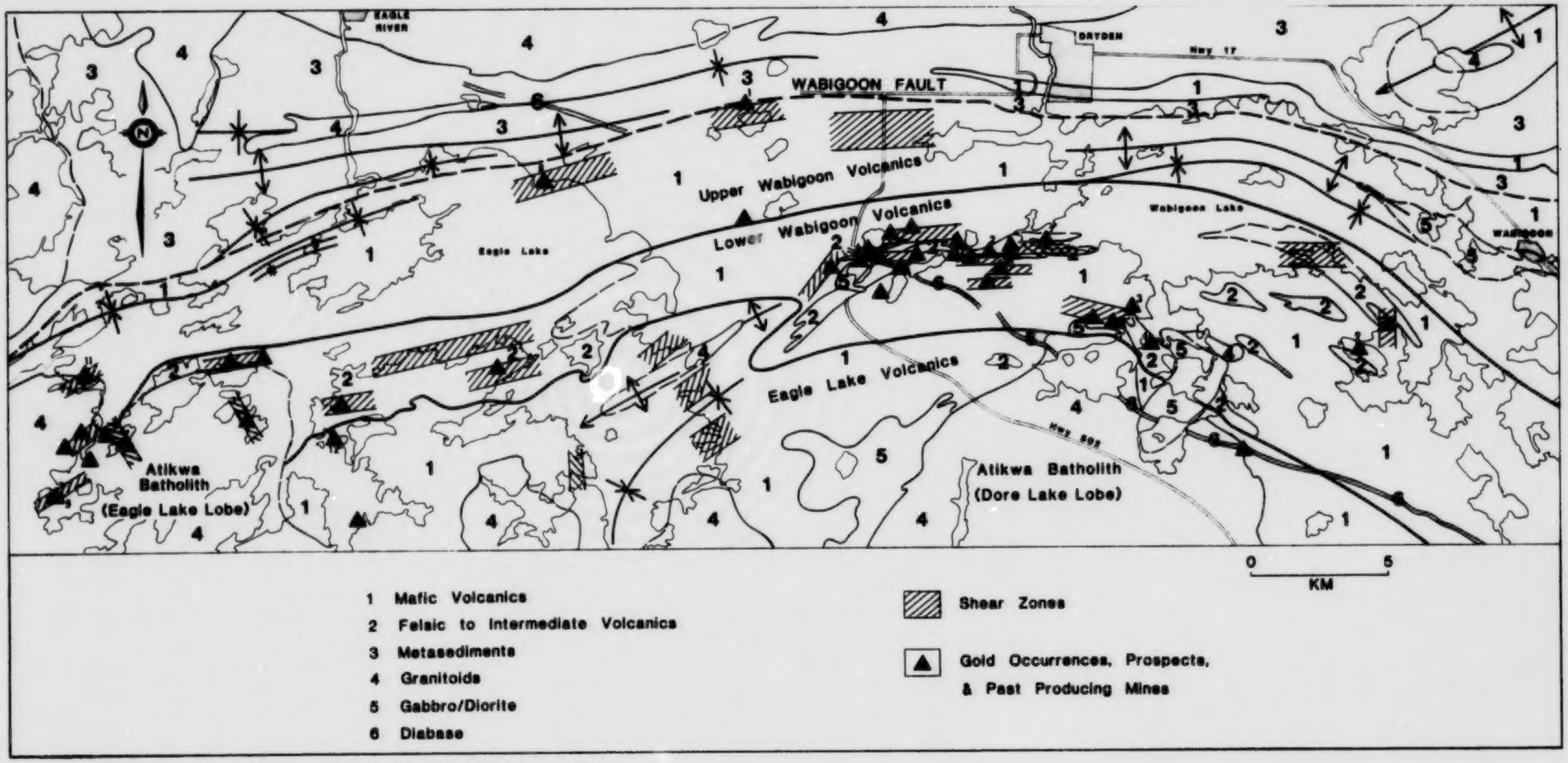

EAGLE RIVER
DRYDEN
Hwy 17
WABIGOON FAULT
Upper Wabigoon Volcanics
Lower Wabigoon Volcanics
Eagle Lake Volcanics
Eagle Lake
Wabigoon Lake
WABIGOON
Hwy 502
Atikwa Batholith (Eagle Lake Lobe)
Atikwa Batholith (Dore Lake Lobe)
N
0
5
KM
1 Mafic Volcanics
2 Felsic to Intermediate Volcanics
3 Metasediments
4 Granitoids
5 Gabbro/Diorite
6 Diabase
Shear Zones
Gold Occurrences, Prospects, & Past Producing Mines

Figure 1.3. Geology and gold deposits, Eagle and Wabigoon Lakes.

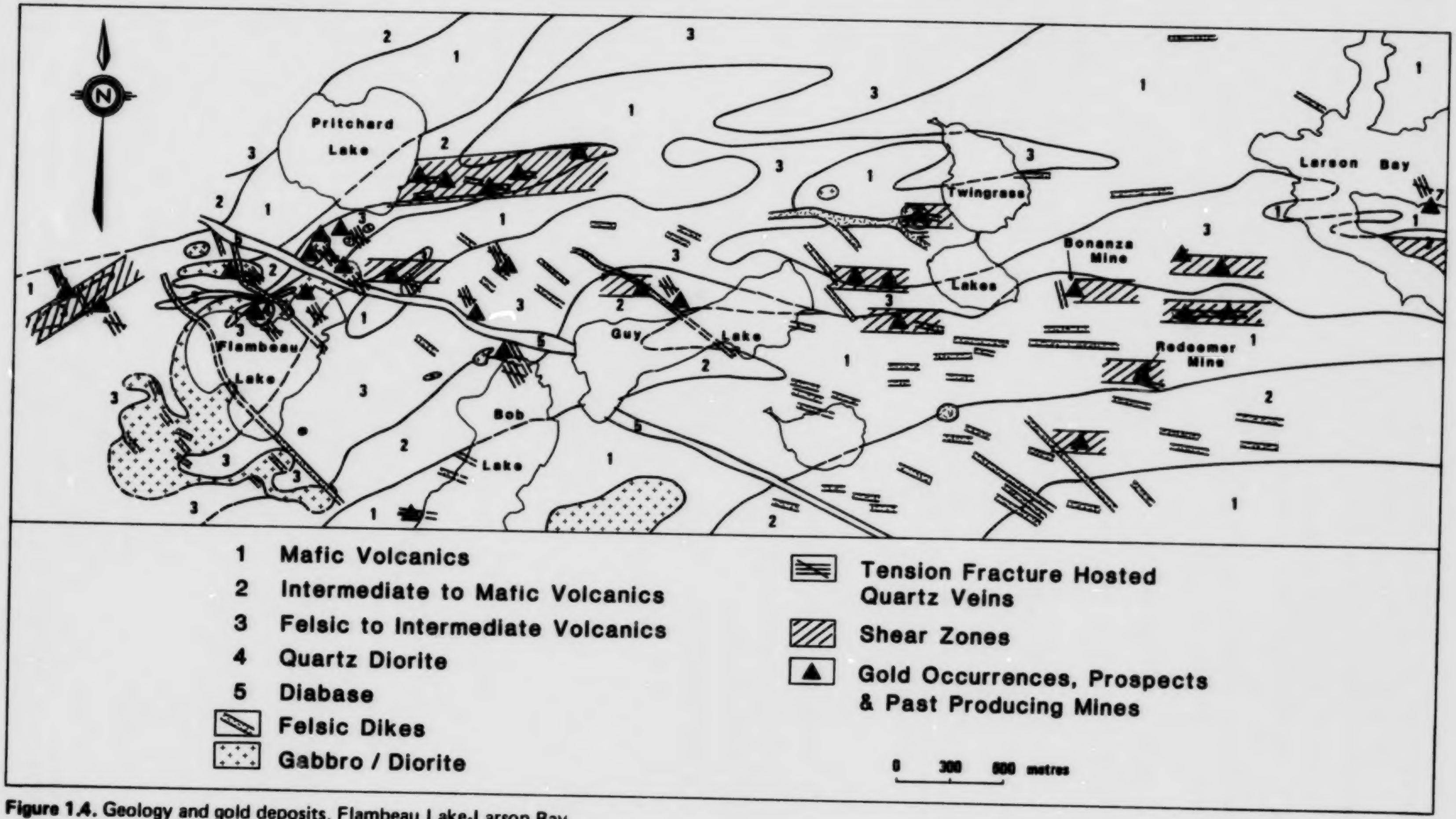

N
Pritchard Lake
Twingrass Lakes
Larson Bay
Bonanza Mine
Redeemer Mine
Guy Lake
Flambeau Lake
Bob Lake
1 Mafic Volcanics
2 Intermediate to Mafic Volcanics
3 Felsic to Intermediate Volcanics
4 Quartz Diorite
5 Diabase
Felsic Dikes
Gabbro / Diorite
Tension Fracture Hosted Quartz Veins
Shear Zones
Gold Occurrences, Prospects & Past Producing Mines
0 300 600 metres

Figure 1.4. Geology and gold deposits, Flambeau Lake-Larson Bay.

Anomalous gold mineralization has been discovered in the sheared, altered, pyritic, granitic host rocks at the Eldorado Prospect (Figure 1.3, Number 5) at Eagle Lake, which suggests that the Atikwa Batholith may have the potential to host low-grade gold deposits in zones of deformation where there is significant alteration and pyritization. At the Viking Prospect (Figure 1.3, Number 11) at Eagle Lake, the granitic host rock is very quartz-rich which may indicate pervasive silicification. Feldspars are typically altered, and patchy gossan and hematite staining occur along fractures in the granite, with variable amounts of pyrite disseminated throughout. However, gold appears to be strictly confined to quartz veins.

Gold mineralization occurs within the Wabigoon Fault zone at the Morning Star (Figure 1.3, Number 8) and Aubrey Lake (1) Occurrences northeast of Eagle Lake. At the Morning Star Occurrence gold occurs within boudinaged quartz veins of variable thicknesses hosted by intensely sheared and iron carbonatized mafic metavolcanics. At the Aubrey Lake Occurrence gold occurs within narrow arsenopyrite-rich sulphide layers within sheared and altered mafic metavolcanics. Abundant quartz veining and iron carbonate alteration have been observed elsewhere along the fault.

A few of the more promising gold occurrences at Eagle and Wabigoon Lakes consist of numerous gold-bearing quartz veins controlled by tension fractures concentrated at Flambeau Lake (Figure 1.3, Number 6 and Figure 1.4), a few kilometres west of Wabigoon Lake. The majority of the quartz veins have a northwesterly trend, ranging between 120° to 150° and averaging 135°. The quartz veins are hosted by all rock types but are concentrated, and attain their greatest thicknesses, within competent felsic to intermediate intrusive rocks and metavolcanics. Competency and susceptibility to fracturing of the host rock is the controlling influence on the concentration of the veins. Another controlling factor on gold deposition is the presence of abundant disseminated magnetite in many of the metavolcanics and intrusive rocks which host gold-bearing quartz veins. Abundant magnetite within the country rocks may have served as a chemical trap for gold precipitation during sulphidation of magnetite to pyrite during circulation of mineralized hydrothermal fluids through open fissures in the country rocks. At Flambeau Lake, gold-bearing quartz veins are hosted by magnetite-rich quartz-diorite. Magnetite is abundant where the quartz-diorite is relatively unaltered, but it is sparse or absent in the altered wall rock adjacent to the veins where it is replaced by abundant pyrite.

The consistent northwestern trend of tension fracture-hosted quartz veins and numerous felsic dikes, as well as the overall northwestern trend of a late diabase dike that extends across the area, indicates that tension fractures controlled the emplacement of late intrusive rocks as well as quartz veins. These fractures can be attributed to dextral movement on the Wabigoon Fault, during simple shear deformation, when tension fractures were developed perpendicular to the maximum elongation (Ramsay 1967).

Northwest-trending tension fractures control gold-bearing quartz veins elsewhere in the Wabigoon Lake area such as at the EDB-1 Occurrence (Figure 1.3, Number 4) at Contact Bay on Wabigoon Lake. Recent prospecting led to the "rediscovery" of the EDB-1 Occurrence which consists of a small shaft and some old test pits. The location of the EDB-1 Occurrence has never been accurately indicated on any published map. A northwest-trending tension fracture-hosted quartz vein, in felsic metavolcanics on the south shore of Larson Bay on Wabigoon Lake (Figure 1.3 and Figure 1.4, Number 7), was grab sampled by the author and assayed 1.13 ounces gold per ton, 8.40 ounces silver per ton and 3.64% copper (Geoscience Laboratories, Ontario Geological Survey, Toronto). This is an unstaked and previously undiscovered occurrence and suggests that detailed prospecting in the Larson Bay area may lead to more new gold discoveries. Good prospecting targets in this area would be northwest- or east-trending shear zone or tension fracture-hosted quartz veins in felsic metavolcanics and intrusive rocks.

Stratigraphic Control

The gold mineralization at the W.W. Smith Prospect (Figure 1.3, Number 12), situated on the northern shore of Hardrock Bay on Eagle Lake, is not associated with any obvious or significant structural deformation. Mineralization occurs within sulphide-rich, mafic metavolcanic flows and interflow tuff and cherty layers, along east-trending stratigraphic horizons close to the contact between mafic flows to the south, and dominantly felsic flows and pyroclastics to the north.

All the rocks are intruded by numerous north-trending felsic quartz- and quartz-feldspar porphyry dikes. Sulphide mineralization dominantly consists of pyrrhotite and chalcopyrite disseminated within the metavolcanics, and fine-grained, disseminated pyrite occurring throughout the chert and tuff or concentrated in thin layers.

To the east, along the immediate northern shore of Hardrock Bay, a continuous unit of grey, thickly laminated chert interlayered with abundant pyrite can be followed westwards into a 10 m wide zone of sulphide-rich (10 to 60% or more), massive, heavily gossan-stained, volcanic rocks in contact with moderately sheared mafic flows. The host rock in the sulphide zone is very hard, massive, and fine-grained, and appears to be composed of interlocking quartz and feldspar crystals. Alteration consists of albitized or sericitized feldspars and abundant chlorite and epidote accompanied by uralite, leucoxene, and minor carbonate. A grab sample taken from the zone by the author assayed 0.38 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

A sulphide horizon is well exposed to the west on a small gossan-stained island. Intermediate to mafic metavolcanics and very thinly bedded, fine-grained, tuffaceous and cherty layers host the sulphide mineralization on the island, but intense gossan-staining has obscured geological relationships. The host rocks are very massive, hard, and do not appear to be sheared, fractured, or intensely altered.

Further west of the island, on a small headland, gold is associated with pyritic chert. A 1.2 m (4 feet) chip sample across a pyritic chert "band" assayed 0.25 ounce gold per ton and "good" gold assays were obtained from samples taken from iron formation (Leaming 1948).

Results of drilling and chip sampling on the mineralized zones by various exploration companies has indicated the presence of consistent, low grade, and anomalous gold mineralization over variable widths. Two of the best drill intersections were 0.10 ounce gold per ton over 12.2 m (40 feet) and 0.05 ounce gold per ton over 43 m (140 feet). Three 12.2 m (40 feet) to 22.9 m (75 feet) channel samples taken from a sulphide-rich zone, exposed on the small island described previously, consistently assayed 0.146 ounce gold per ton (Assessment Files, Resident Geologist's Office, Kenora).

Previous reports have described the mineralized zones as silicified shear or replacement zones in mafic metavolcanics. However, no shearing, fracturing, or silicification appears to be present in the sulphide-rich rocks. The association of consistent, low grade, and anomalous gold mineralization within relatively undeformed, variably altered rocks suggests that the W.W. Smith Prospect is stratigraphically, rather than structurally, controlled.

Auriferous, pyritic, interflow chert and tuff may represent chemical sedimentation during the hiatus between basaltic volcanism of the Eagle Lake Volcanics and the felsic volcanism of the Lower Wabigoon Volcanics. Similar occurrences have been documented by Thurston (1986) in the Uchi Subprovince. Later hydrothermal activity may have redistributed gold within the iron-rich metavolcanics. Sulphidation may have occurred by replacing iron locked up in silicate minerals with sulphide minerals, and providing sites for gold deposition. The overall alteration and presence of chlorite, epidote, and albitized feldspars (Leaming 1948) indicate that the flows were pervasively altered by hydrothermal fluids.

Good potential for stratigraphically controlled gold mineralization exists in the Eagle Lake area, especially along the contact between the felsic and mafic metavolcanics with which the W.W. Smith Prospect at Hardrock Bay is associated. The contact extends eastwards for 6.5 km: banded iron formation, chert, and fine-grained, bedded, felsic tuffs have been intersected in diamond-drill holes, in the vicinity of the contact, as far east as Stanton Island at the extreme east end of Eagle Lake. Airborne magnetic and electromagnetic surveys, flown for a number of companies, have delineated east-trending magnetic highs and coincident electromagnetic conductors of variable strengths which occur within the vicinity of the contact (Assessment Files, Resident Geologist's Office, Kenora). Iron formation and chert also occur at North Twin Island, at Schroeder Island, and on Farabout Peninsula, along the contact between the felsic and overlying mafic metavolcanics to the north. This contact could also host similar gold occurrences.

Stratigraphically controlled gold mineralization is found at other localities as well as at Eagle Lake. At Contact Bay (Figure 1.3, Number 3) of Wabigoon Lake, recently discovered high-grade gold mineralization is hosted by granular, recrystallized quartz associated with banded magnetite iron formation within sheared interflow sediments. At Mud Bay (Figure 1.3, Number 9) on Butler Lake, immediately south of Wabigoon Lake, gold is associated with pyritic, "cherty" rock in close proximity to felsic pyroclastics. A grab sample, taken by the author from the sulphide zone at Mud Bay, gave 1095 ppb gold (Geoscience Laboratories, Ontario Geological Survey, Toronto). Another occurrence of high-grade gold mineralization associated with cherty interflow sediments and quartz stringers, occurs on Moose Bay at the southern end of Dinorwic Lake, and is described in the Dinorwic-Whitewater Lakes section of this report.

A large-scale, more regional, stratigraphic control of gold mineralization occurs at Eagle-Wabigoon Lakes. The majority of gold deposits in the area are concentrated at a transition upward from a lower mafic sequence, the Eagle Lake Volcanics, into an overlying middle sequence of mixed tholeiitic to calc-alkaline composition, the Lower Wabigoon Volcanics. This characteristic transition has been suggested as a locus for gold mineralization throughout the Kenora Dryden-Fort Frances Region (Blackburn and Hailstone 1983; Blackburn and Janes 1983) such as at the Duport Mine in the High Lake-Shoal Lake area, at the Wendigo and Sultana Mines at northeastern Lake of the Woods, at the Nuinsco Property at Cameron-Rowan Lakes, and in the Manitou Lakes-Stormy Lake area. Although gold occurs within structurally controlled quartz veins, the concentration of gold deposits at a specific stratigraphic level is of primary importance for exploration. It suggests that there may have been original syngenetic gold enrichment or later concentration of gold due to hydrothermal processes and the structural favourability of these transition zones.

Dinorwic–Whitewater Lakes by J. Parker

The Dinorwic-Whitewater Lakes area is located 25 km southeast of Dryden. Dinorwic Lake is linked by water to Wabigoon Lake, and Whitewater Lake is located south of Stanawan Bay on Dinorwic Lake.

Gold exploration began here in 1897, at the Big Ruby Occurrence, where a 9 m (30 feet) shaft was sunk on a high-grade, gold-bearing quartz vein on the northern shore of Dinorwic Lake. The Moose Bay Prospect, at the southwestern end of Dinorwic Lake, was developed at approximately the same time. Two deep test pits, an open cut, and a 31 m (102 feet) shaft with some drifting were reported by Carter (1901). In late 1939, two shafts and an open cut were sunk at the Van Houten Prospect, west of Dinorwic Lake, which produced 3 ounces of gold before operations ceased in 1940. Very little work has been conducted in the area since that time, with the exception of base metal exploration during the 1960s and 1970s. The geology at Dinorwic Lake was mapped by Satterly (1943), as part of the Dryden-Wabigoon Map Sheet, and the geology in the vicinity of Whitewater Lake was last mapped by Thomson

(1934). The discovery of new gold occurrences at Whitewater Lake and the "rediscovery" of the Moose Bay Prospect on Dinorwic Lake resulted from prospecting in 1986. The location of the Moose Bay Prospect has never been indicated on any published map. Recent work in the area, by the author, indicates that the majority of occurrences are structurally controlled, but that a stratigraphically controlled gold occurrence has been recognized.

The Dinorwic-Whitewater Lakes area is situated at the eastern end of the Lower Wabigoon Volcanic Group. Satterly (1943, Figure 2) indicated that the volcanic rocks are folded about northeast-trending synclinal and anticlinal fold axes west of Dinorwic Lake. Southwest of Dinorwic Lake, the Lower Wabigoon Volcanics have been interpreted (Blackburn *et al.* 1982, Figure 3.1) to be folded about a northeast-trending axis, and to be identical to the Pincher Lake Volcanic Group which extends into the Upper Manitou Lake area. The Manitou Straits Fault extends northeastwards from the Manitou Lakes into the Dinorwic Lake area, and is responsible for a major northeast-trending shear zone and associated subparallel shears which extend through the lake. An airborne magnetic survey flown for R.J. Kasner (Assessment Files, Resident Geologist's Office, Kenora) over the Tobacco Lake area, east of Dinorwic Lake, indicates the presence of a broad fold with an apparent west- or west-northwest-trending fold axis. This fold structure may be related to an anticlinal fold axis which extends eastwards from the southwestern corner of Melgund Township, east of Dinorwic Lake, into the Tobacco Lake area. The Manitou Straits Fault and numerous west-northwest-trending linear magnetic lows, which are interpreted to be shear zones, crosscut the fold.

The dominantly mafic metavolcanics in the area are intercalated with lenses of felsic metavolcanic flows and pyroclastics and felsic and mafic intrusive rocks. The rocks are commonly intensely sheared, chloritized, and iron-carbonatized and host variable amounts of disseminated sulphide mineralization. Satterly (1943) mapped an extensive area of chlorite-carbonate schist centred on Dinorwic Lake, and Beard and Rivett (1977) recognized intense carbonatization, quartz-carbonate veining, and gold mineralization. Numerous quartz veins hosting abundant pyrite, arsenopyrite, and chalcopyrite occur throughout the sheared metavolcanics. Grab samples from quartz veins and wall rocks, taken by the author along the northern shore of Dinorwic Lake, assayed trace to 65 ppb gold and were anomalous in arsenic, with values ranging from 125 ppb As to 1.54% As. Immediately north of Dinorwic Lake, at the Niemi and H.W. 123 Occurrences, very high arsenic values (up to 7.5%) are associated with gold and silver mineralization (Geoscience Laboratories, Ontario Geological Survey, Toronto). The significance of the high arsenic values, if any, has not been determined, but elevated levels of arsenic are concentrated within quartz veins and intensely carbonatized wall rocks, some of which are associated with gold mineralization.

The majority of gold occurrences in the area consist of gold-bearing quartz veins hosted by north- or northeast-trending shear zones occurring in all rock types. Variable wall rock alteration consists of chloritization and carbonatization (either iron or calcium carbonate) which may be accompanied by pyritization and sericitization. The alteration can be very intense and extensive but is commonly confined to the sheared host.

At Whitewater Lake, recently discovered gold occurrences consist of gold-bearing quartz veins within a wide, intense, north-northeast-trending (015°-020°) shear zone hosted by mafic metavolcanic flows. Some Quartz veins are controlled by the shearing, but the majority appear to be confined to fractures and minor shears which crosscut the shearing, and may indicate the presence of crosscutting, east-northeast-trending structures. The quartz veins are typically barren of sulphides, but host chloritic and pyritic xenoliths of wall rock associated with visible gold. The sheared wall rock commonly contains abundant disseminated pyrite (2 to 15%), and where the wall rock is intensely altered, it hosts consistent low grade and anomalous gold mineralization.

Ground electromagnetic and magnetic surveys conducted in the vicinity of Kaminnassin Lake for Golden Range Resources Incorporated (Assessment Files, Resident Geologist's Offices, Kenora), immediately east of Whitewater Lake, indicate the presence of numerous, northeast-trending, magnetic lows interpreted as shear zones subparallel to the Manitou Straits Fault. The shear zone at Whitewater Lake appears to be one of these structures. Electromagnetic conductors which may be due, in part, to topography, either crosscut the lows or are coincident with them. Airborne electromagnetic and magnetic surveys, flown south of Whitewater Lake for June Resources Incorporated (Assessment Files, Resident Geologist's Office, Kenora), indicate the presence of northeast-trending magnetic lows and northwest- and northeast-trending conductors extending into the Whitewater Lake area.

The Moose Bay and Van Houten Prospects consist of gold-bearing quartz veins controlled by north-northeast-trending shear zones (025°), and flat-lying and vertical tension fractures which crosscut shearing. At the Moose Bay Prospect, located on Moose Bay at the southwestern corner of Dinorwic Lake, the host rock is an extensive, felsic, feldspar porphyry, probably intrusive, while at the Van Houten Prospect, located about 1.6 km directly west of Moose Bay, quartz veins are hosted by a granodiorite sill. The wall rocks are variably pyritic, sericitized and carbonatized, and at the Van Houten Prospect, they host accessory molybdenite and chalcopyrite. An airborne magnetic survey flown in the vicinity of the Van Houten Prospect for R.J. Kasner (Assessment Files, Resident Geologist's Office, Kenora), indicates the presence of a linear northeast-trending magnetic low extending through the area, as well as a weak, crosscutting, east-northeast-trending magnetic low.

Other gold occurrences in the vicinity of Dinorwic Lake, such as the Big Ruby, Niemi, H.W. 123, Butler Lake, and Pidgeon-Wabigoon Lake occurrences have been described previously (Parker 1985, 1986). Most consist of gold-bearing quartz veins dominantly controlled by east-trending crosscutting fractures within northwest- and northeast-trending shear zones.

A gold occurrence that is stratigraphically and structurally controlled is situated immediately west of Moose Bay on Dinorwic Lake. Fracture-hosted, gold-bearing quartz stringers occur within discontinuous pyritic, cherty, interflow metasediments bounded by massive, mafic, metavolcanic flows. The metasediments are very thinly laminated, carbonatized, and sericitic. Grab samples from the chert, taken by the author, assayed anomalous values of gold, while grab samples, taken by the author, of the pyritic chert and quartz stringers assayed 0.15 and 1.51 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The above observations suggest that the Dinorwic Lake area is structurally complex, with dominant north-northeast shear zones, related to the Manitou Straits Fault, controlling quartz veins at the majority of known gold occurrences. Gold-bearing quartz veins are also controlled by crosscutting, east-trending fractures. The presence of gold mineralization in the wall rocks of the northeast-trending shear zone at Whitewater Lake, suggests that other northeast shears, such as the structures at Kaminnassin Lake, may have gold-bearing potential.

Evidence for crosscutting west-northwest and east-northeast-trending structures in the area are linear magnetic lows, indicated by the results of airborne magnetic surveys, and the presence of crosscutting fractures and minor shears within northeast-trending shear zones. A lack of field evidence makes the interpretation of these crosscutting features somewhat tenuous. The numerous east-trending fractures which control many of the gold-bearing quartz veins may also be tension fractures, developed perpendicular to the maximum elongation, during simple shear along the Manitou Straits Fault and its associated shear zones. If that is the case, the east-west orientation of the fractures could indicate dextral movement along the fault.

Gold occurs within fracture-hosted quartz stringers in sulphide-rich, cherty, interflow metasediments. The rigid, competent, chert responded in a brittle manner during deformation, providing open fractures for the emplacement of quartz veins, and acting as a structural trap for gold deposition.

Melgund–Revell–Hyndman Townships Area by J. Parker

Gold exploration began in Melgund-Revell-Hyndman Townships as early as 1888. The only gold production recorded is from outside the area, at the Sakoose Mine and at the Tabor Lake Prospect located immediately south of Melgund Township. Exploration for copper-nickel occurred during the 1950s and 1960s. Recent gold exploration, concentrated in Melgund and Hyndman Townships, has been conducted by Lynx-Canada Explorations Limited and Teck Corporation in Hyndman Township, Silver Lake Resources (now known as International Platinum Corporation) at the New Klondike Prospect, and Sulpetro Minerals Limited (now known as Novamin Resources Incorporated) at the Pathfinder and Tabor Lake Prospects. Numerous gold occurrences are located in the area, but relatively little is known about their structural and stratigraphic controls.

Rocks are dominantly fine- to coarse-grained, massive and pillowed, mafic metavolcanic flows, which host widely scattered, narrow, lensoid interflow units of massive and brecciated rhyolitic flows and tuffs. The metavolcanics are intruded by numerous felsic dikes, by the Revell Batholith, which occupies the southern half of Revell Township, and by the Basket Lake Batholith, which occupies the northwestern half of Hyndman Township. The metavolcanics extend eastwards from Melgund and Revell Townships into Hyndman Township, where they occupy a northwest-trending "wedge" between the Revell and Basket Lake Batholiths. Metamorphic grade is commonly greenschist facies in Melgund Township, but increases to amphibolite facies (hornblende hornfels) eastwards towards the two batholiths. The metavolcanics in Hyndman Township are amphibolite grade, with a narrow contact aureole extending along the boundary of the Revell Batholith. The amphibolite facies rocks are composed of plagioclase, amphibole, and minor quartz with the appearance of garnet in the eastern half of Hyndman Township. The metamorphic isograd between the greenschist and amphibolite facies rocks is marked by this mineralogical change and the disappearance of intense carbonatization, which is prevalent in the greenschist facies rocks.

Lack of top indicators in the area has made structural interpretation difficult. Satterly (1960) and Blackburn (1981a) recognized the presence of an east-plunging anticlinal fold axis along the south boundary of Melgund Township. Satterly (1960) also indicated that the foliation throughout the area parallels the borders of the batholiths. However, two zones of intense deformation which are spatially and genetically related to gold occurrences have been overlooked during previous mapping. A northeast-trending zone of intense shearing extends through the southeast corner of Melgund Township and is associated with numerous gold occurrences. Movement along the structure is interpreted to be dextral based on property mapping by Silver Lake Resources (Assessment Files, Resident Geologist's Office, Kenora), indicating right-hand sense of displacement of felsic dikes and mappable rock units in the vicinity of the shear. Another significant structure, in Hyndman Township, is a northwest-trending shear zone dipping steeply south and extending through the wedge of mafic metavolcanics between the Revell and Basket Lake Batholiths. Felsic metavolcanics and intrusive rocks within the shear zone are mylonitized, while the mafic metavolcanics are chloritized and fissile. Z-drag folding of quartz veins, and right-hand offsets of veins and dikes along fractures and shears, both observed by the author, indicate overall dextral movement along the deformation zone. Airborne magnetic and electromagnetic surveys flown for Keeba Resources Limited (Assessment File, Resident Geologist's Office, Kenora), indicate the presence of this major structure in the form of a strong, linear, northwest-trending magnetic low associated with coincident, weak, electromagnetic conductors. Gold occurrences in Hyndman Township are controlled by northwest-trending shear zones which are subparallel to this structure.

Extensive carbonate alteration associated with sericitization and fuchsite alteration extends from the northern boundary of Melgund Township, at Dyment, and broadens into a wide zone which extends south into the Tabor Lake area and westwards towards Dinorwic Lake. The alteration terminates in the east at the greenschist-amphibolite facies isograd. A lithogeochemical study of the extensive carbonate alteration, conducted by Sulpetro Minerals Limited along the southern boundary of Melgund Township and in the vicinity of Tabor Lake, revealed that the alteration dominantly consists of magnesium carbonate (dolomite) with only local concentrations of iron and calcium carbonate. Carbonate content in the mafic metavolcanics generally increased from 7.5% to 15.0% with enrichments in cobalt, nickel, and chromium. Arsenic was found to be concentrated in elevated levels in silicified and carbonatized rocks associated with gold mineralization in a similar manner to the association of arsenic with carbonate alteration and low grade gold mineralization in the Dinorwic Lake area. Gold occurrences within amphibolite facies metavolcanics in Hyndman and Revell Townships consist of boudinaged quartz veins controlled by intense, northwest-trending, shear zones associated with the major northwest deformation zone described previously. Wall rocks are commonly chloritized and sericitized with weak to moderate calcium carbonate alteration, and variably pyritic with accessory pyrrhotite and magnetite. Iron carbonate is rare and occurs erratically at a few occurrences. Northwest-trending diorite dikes and felsic feldspar and quartz feldspar porphyry dikes occur throughout the area and are commonly associated with the gold occurrences. Quartz veins host minor (<1 to 2%) amounts of disseminated pyrite with accessory chlorite, chalcopyrite, galena, tourmaline, and hematite.

Grab samples from the majority of the gold occurrences in the area, taken by the author, assayed low grade and anomalous gold values with some erratic high values. Coarse visible gold was observed in a quartz vein at the Swamp or H.W. 642 Occurrence, where chip samples taken from the vein by A. Glatz (prospector, Dryden), assayed between 0.02 and 30.01 ounce gold per ton (Assessment Files, Resident Geologist's Office, Kenora). A grab sample of a pyritic quartz vein taken by C. Blackburn, from the Old Showing Occurrence, assayed 4.38 ounces gold per ton and 0.26 ounce silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto). Samples from quartz veins, taken by Lynx-Canada Limited at the Dumond Prospect, have assayed between 0.072 and 1.54 ounces gold per ton (Assessment Files, Resident Geologist's Office, Kenora), and wall rocks on the property are also known to carry significant amounts of gold. Chip samples from pyritic, rusty, rhyolite schist bands, taken by J. Satterly in the vicinity of the Dumond Prospect, assayed 0.16 ounce gold per ton across 0.6 m (2 feet), and 4.35 ounces gold per ton across 10 cm (4 inches) (Assessment Files, Resident Geologist's Office, Kenora). Satterly (1960) described the rhyolite schist as occurring in lenticular bands ranging from 10 cm (4 inches) to 6 m (20 feet) wide and striking northwest. At the Dumond Occurrence, a chip sample taken by the author from altered, sheared, mafic metavolcanics containing coarse amphibole, assayed 0.28 ounce gold per ton across 0.6 m (2 feet) (Geoscience Laboratories, Ontario Geological Survey, Toronto). The only two occurrences hosted by felsic intrusions are the Pidgeon-Hyndman Township Prospect, located within the Revell Batholith along its northeastern contact, and the new Showing Occurrence, located within a granodiorite sill-like intrusion immediately east of the Revell Batholith. Gold assays of grab samples from both properties have given low values with a few, erratic, high assays. Teck Corporation conducted drill programs on both properties, but only a few, anomalous, gold values were intersected (Assessment Files, Resident Geologist's Office, Kenora).

Ground magnetic and VLF-electromagnetic surveys, conducted by Teck Corporation over a large portion of Hyndman Township, indicate that a number of gold-bearing quartz veins are associated with VLF-electromagnetic conductors which extend along the flanks of linear, northwest-trending magnetic highs. These geophysical signatures occur elsewhere in Hyndman Township, on the ground previously held by Teck, and may provide good prospecting targets.

Amphibolite facies mafic metavolcanics along the western contact of the Revell Batholith in Melgund Township, host gold-bearing quartz veins controlled by northeast-trending shear zones. Grab samples of quartz veins and wall rocks taken by the author from the majority of occurrences, only assayed low, anomalous, gold values. Sulphide occurrences consisting of abundant (10 to 25%) disseminated pyrrhotite and pyrite within massive, dark green to black, aphanitic, hornblende-hornfelsed, mafic metavolcanics are common in this area. A grab sample, taken by the author, from one of these occurrences (H.W. 486 Occurrence) assayed 1000 ppb gold (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The majority of gold occurrences in Melgund Township are situated within intensely carbonatized, greenschist facies grade, mafic metavolcanics. Gold-bearing quartz veins are controlled by northeast-trending shear and fracture zones associated with the major northeast-trending deformation zone extending across Melgund Township. Mineralized quartz veins are also hosted by felsic feldspar and quartz-feldspar porphyry dikes which are commonly east- and northwest-trending and are concentrated in the southwestern corner of Melgund Township. Quartz veins commonly host small amounts of disseminated pyrite with accessory galena and minor chalcopyrite.

The New Klondike Prospect, located immediately southeast of Borups Corners on the Trans-Canada Highway, one of the more significant gold occurrences in the area, occurs within the major northeast-trending deformation zone described previously. The property was acquired in 1983 by Silver Lake Resources (now known as International Platinum Corporation), who conducted geological mapping, magnetometer and VLF-electromagnetic surveys, diamond drilling, and channel and bulk sampling. Samples taken from quartz veins in numerous trenches across the property assayed between 0.02 and 36.22 ounces gold per ton (Assessment Files, Resident Geologist's

Office, Kenora). Rocks within the shear zone consist of intensely altered, sheared, and fissile mafic metavolcanics intruded by sheared and altered northeast-trending feldspar-porphyry dikes. The wall rocks contain 1 to 20% disseminated pyrite and host two sets of quartz veins. An early set of veins striking parallel to the shear zone are intensely boudinaged and contain variable amounts of pyrite, chalcopyrite, and tourmaline. A later set of tightly folded, ptygmatic, quartz veins strike northwest and crosscut the shear zone, which indicates two periods of deformation and two mineralizing events.

Gold occurrences in the southwestern corner of Melgund Township have been the focus of exploration by Sulpetro Minerals Limited (now known as Novamin Resources Incorporated) during the last few years. Alteration is most intense in this area and is characterized by carbonatization resulting in bleached pale brown to grey mafic metavolcanics and variable silicification and pyritization. Intense fuchsite alteration occurs at the Pathfinder Prospect where mafic metavolcanics have been completely altered to coarse, flaky, fuchsite and carbonate. Wide, east- and northwest-trending felsic dikes host mineralized quartz veins at the majority of gold occurrences. Gold mineralization is typically anomalous to low grade, with erratic high values, as is the case with most gold occurrences in the general area. Diamond drilling conducted at the Pathfinder Prospect and other nearby occurrences, by Sulpetro Minerals Limited, intersected trace to low anomalous gold values with the exception of the Glatz Showing-West Zone. A drillhole targeted on a wide felsic feldspar-porphyry dike, hosting numerous gold-bearing quartz veins, intersected 0.07 ounce gold per ton across 7.3 m (24 feet) including a 0.39 m (1.3 feet) section assaying 0.915 ounce gold per ton (The Northern Miner, December 30, 1985).

The above observations indicate that major northeast- and northwest-trending deformation zones and associated shear zones control the majority of gold occurrences in the Melgund-Revell-Hyndman Townships area. Intense and extensive carbonate alteration in Melgund Township does not appear to be confined to deformation zones, with the exception of the New Klondike shear zone. Carbonate alteration around Tabor Lake was found to be dominantly magnesium carbonate, which may explain the lack of significant gold mineralization despite abundant deformation and alteration. Lithogeochemical studies to determine the type of carbonate in areas of extensive alteration (e.g. around Dinorwic Lake) may be useful in locating specific target areas for gold exploration. Areas where iron carbonate alteration is dominant may have more potential for hosting significant gold mineralization than areas where magnesium or calcium carbonate alteration is dominant. Visible gold and high grade gold values can be obtained at a number of occurrences, but the majority host anomalous and low grade gold mineralization. Prospecting in Melgund Township should be directed at felsic dikes and northeast-trending shear zones hosting quartz veins within silicified, pyritic wall rocks.

Amphibolite facies rocks in Hyndman Township host gold-bearing quartz veins in northwest-trending shear zones, but exploration has shown that gold mineralization is commonly erratic. prospecting should be directed along northwest-trending shear zones and the numerous quartz veins which occur throughout the area, and in the vicinity of the geophysical targets described previously. Another good prospecting target in Hyndman Township is the gold-bearing "pyritic, rhyolite schist bands" described by Satterly (1960). Numerous occurrences of these felsic rocks are widely scattered throughout the township, and may have considerable gold potential if a wide zone with a long strike length can be found.

Jaffray–Haycock Townships, and Bigstone Bay by M.R. Hallstone and C.E. Blackburn

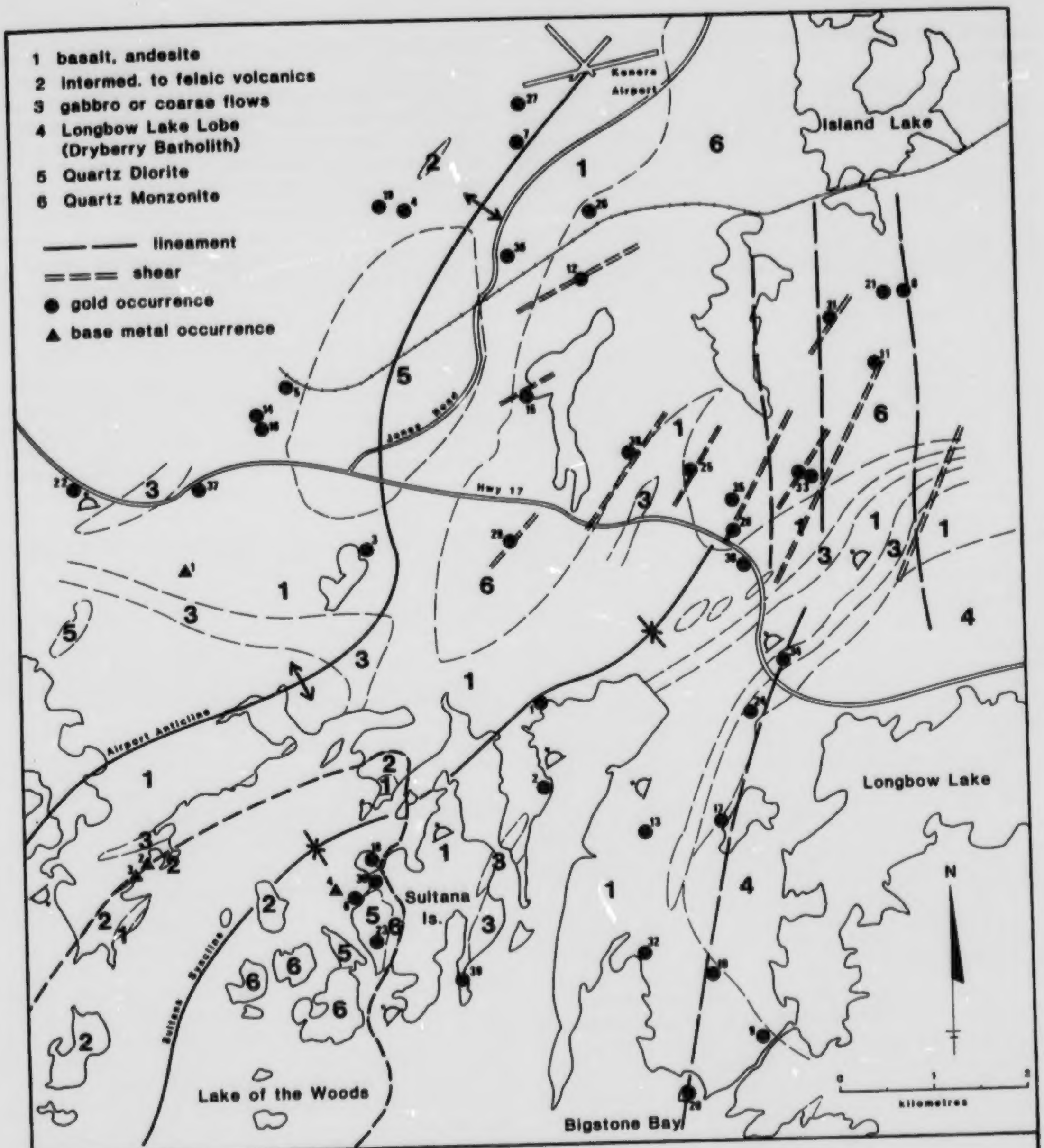
Gold occurrences in the Kenora area are associated with a wedge of metavolcanics and metasediments bounded to the northwest by rocks of the English River Subprovince and to the southeast by the Longbow Lake lobe of the Dryberry Batholith (Figure 1.5). Gold mineralization occurs in three environments: within the northeast-trending volcanic wedge; within the Island Lake diorite; and occurrences associated with the transition from lower mafic flows into overlying felsic to intermediate volcanic rocks. In all three environments gold occurrences are found in northeast-trending shear zones.

Volcanic–Hosted Occurrences

Volcanic-hosted gold occurrences within the northeast-trending volcanic wedge are accompanied by pyrite, pyrrhotite, and trace chalcopyrite associated with quartz-tourmaline veins in sheared metabasalt. Silica, tourmaline, biotite, chlorite, and minor carbonate are common alteration products. Felsite dikes commonly occur close to most of these occurrences. Shearing appears to be parallel to axial planes of isoclinal folds, and is the dominant control on gold deposition (Davies and Smith 1984). Some of these occurrences have been described by Davies and Smith (1984) and Blackburn, Davies and Smith (1985). Quartz veins are either parallel or sub-parallel to the shear zones, or within tension fractures, depending upon the mechanical properties of the rock. To the southeast the volcanic wedge is intruded by the Jones Road quartz monzonite, and by the Island Lake diorite to quartz diorite, the latter being the host for the second group of gold occurrences.

Diorite–Hosted Occurrences

The Island Lake diorite to quartz diorite has not been extensively mapped other than at the property scale, and little is known about its extent and overall composition. Mafic xenoliths, in places constituting intrusion breccias, are common within the intrusion, which is cut by late fine-grained northeasterly trending intermediate dikes. These dikes may occupy northeast-trending shears, the locus of which may have been controlled by anisotropic zones set up by the clustering of mafic xenoliths. Late north-trending sinistral faults offset the felsic dikes and shear zones. This relationship is clearly seen in stripped outcrops at the Silverman Occurrence. These northerly trending faults may have flexure-folded the earlier shears, producing zones of weakness and thus a plumbing system for


1 basalt, andesite
2 intermed. to felsic volcanics
3 gabbro or coarse flows
4 Longbow Lake Lobe (Dryberry Batholith)
5 Quartz Diorite
6 Quartz Monzonite
lineament
shear
gold occurrence
base metal occurrence
Kenora Airport
Island Lake
Jones Road
Hwy 17
Airport Anticline
Sultana Syncline
Sultana Is.
Longbow Lake
Lake of the Woods
Bigstone Bay
N
0
1
2
kilometres

Gold Occurrences

1. Abaco
2. Abaco South
3. Aronek Occurrence
4. Benson
5. Black Hawk
6. Burley Shaft
7. Caribou Shaft
8. Champion
9. Climax Occurrence
10. Earngey - Lindberg
11. Emmons
12. Eschweiler
13. Gold Creek
14. Grey Eagle
15. Hilly Lake
16. Horne-Thrasher
17. King Mine
18. Klondyke Shaft
19. Kobold
20. Maiden Island
21. Norway
22. Novasade
23. Ophir Mine
24. Pine Portage
25. Roseman
26. Royal
27. Scramble Mine
28. Silverman
29. Split Lake Occurrence
30. Sultana Mine
31. Sweden
32. Thunder Occurrence?
33. Treasure
34. Triumph South (Gold Cross)
35. Westin
36. Wimor
37. Au (230 ppb)
38. Au (670 ppb)
39. Au (259 ppb)

Base Metal Occurrences

1. Cu, Ag, (Ag 12 ppm)
2. Cu, Ag, (Cu 1350 ppm)
3. Zn, (Zn 640 ppm)
4. Cu, Zn, Au, Ag

Figure 1.5 Geology and gold deposits, Jaffray-Haycock Townships, and Bigstone Bay (geology after King 1983; Ayer 1984).

subsequent mineralization within the Island Lake intrusion.

Gold occurrences within the quartz diorite are hosted by commonly recrystallized and boudinaged quartz-tourmaline veins within northeast-trending shears. Pyrite, pyrrhotite, and minor chalcopyrite (and rare galena at the Eschweiler Occurrence) are commonly present. Saussuritization, tourmaline, silica, and minor carbonate alteration are associated with gold mineralization. Within and bordering the shear zones, the breakdown of feldspar to sericite has enhanced the visibility of quartz grains, giving the rock a distinct augen texture.

Recent work at the Silverman Occurrence, 9 km east of Kenora, has thrown light on factors controlling gold deposition throughout the Island Lake intrusion. In a N36°E-trending shear, entirely within the intrusion, boudinaged and recrystallized, sugary, quartz-tourmaline veins contain pyrite, pyrrhotite, and erratic gold values. Mafic xenoliths occur in the diorite in the vicinity of the occurrence, a common feature at other gold occurrences hosted by the Island Lake intrusion.

In 1986 a stripping and limited channel sampling program was carried out by the Resident Geologist's Office, Kenora, on the Silverman Occurrence. Results of the channel sampling were not encouraging. Sheared diorite and quartz vein material sampled between existing pits and trenches assayed consistently <0.01 ounce gold per ton. Quartz vein material from the old shaft and trenches assayed low amounts of gold, the best being 0.42 ounce per ton. Quartz vein material from the old shaft and trenches assayed low amounts of gold, the best being 0.42 ounce per ton. Sulphide content increases slightly (2 to 3%) to the northeast, along strike of the main vein, but the zone disappears beneath overburden and swamp. Previous work showed that relative to unaltered diorite, sheared diorite shows a gain in K_2O, CO_2, and H_2O and an increase in gold to 8 ppb compared to 2 ppb in unaltered rock (Blackburn, Davies, and Smith 1985).

Anastomosing shears occur approximately 7 m southeast of the shaft, outlining lenticular areas of unsheared rock up to 0.5 m in their long axis. This pattern of shearing may be repeated at larger scales. Flat-lying quartz tourmaline veins occur 30 m southeast of the shaft.

Volcanic Transition Zone Occurrences

Gold occurrences spatially associated with the Dryberry Batholith have been described by Beard and Rivett (1979, 1981). Gold is hosted by quartz-tourmaline veins within northeast- to east-northeast-trending shears in the northwesterly facing lower mafic flows underlying Bigstone Bay, close to the transition (indicated by a dotted line in Figure 1.5) into an overlying sequence of intermediate to felsic volcanic rocks. They are characteristically high in silver, zinc, and lead. Felsic to intermediate pyroclastics within the core of the Sultana syncline host several copper-zinc-silver occurrences spatially related to the transition from the underlying mafic flows.

The base-metal sulphide assemblages within these gold occurrences suggest that they should be considered separately. A number of them occur in the Sultana Island stock, a polyphase intrusion consisting of a porphyritic quartz monzonite core rimmed by medium-grained quartz diorite. The Sultana Mine, the third largest past-producing mine in the Kenora area, is located near the contact with the quartz monzonite and quartz diorite. Within the quartz monzonite strong north-northeast-trending shear zones are common. Auriferous quartz veins are hosted by N20°E shears, up to 10 m wide, which are deflected at the contact between quartz monzonite and quartz diorite, and it is here that the best values were found (J.C. Davies and P.M. Smith, geologists, Ontario Geological Survey, personal communication, 1985).

At the Ophir Mine auriferous crack and seal quartz veins are hosted by a northeast-trending shear which has obliterated phenocrysts in the quartz monzonite and resulted in a dark, biotitic, schist (J.C. Davies and P.M. Smith, geologists, Ontario Geological Survey, personal communication, 1985).

Summary and Recommendations for Exploration

Virtually all gold occurrences are hosted by quartz tourmaline veins within northeast-trending shears, that change their direction slightly when passing from one rock type to another due to a change in mechanical properties. These deflections may set up zones of weakness for mineralized quartz vein emplacement. Further evidence for control by this deflection is the location of gold occurrences near the margin of the Island Lake intrusion. Many of the occurrences within the intrusion are spatially associated with areas of abundant mafic xenoliths, that could have provided a locus for shearing.

The axis of the Sultana Syncline appears to occupy the core of a 4 km wide area, extending from the Champion Mine in the northeast to the Ophir Mine in the southwest, which hosts gold mineralization within northeast-trending shears.

Northeast-trending shears in the Island Lake intrusion are offset by later north-trending sinistral faults: their point of intersection may have provided a focus for hydrothermal systems, and mineralization. These north-trending faults may appear as linear features on airphotos and topographic maps, and should be prospected in the vicinity of their intersection.

Platinum Group Elements by M.R. Hailstone and C.E. Blackburn

Recent increases in the price of platinum have led to considerable interest in the potential for discovery of economic deposits within Kenora Mining Division. Because platinum has not commonly been assayed for during exploration for copper and nickel in mafic and ultra-mafic intrusions, very little information exists in the literature and exploration files. However, a number of different types of intrusive bodies warrant further investigation.

Platinum group element values were first recorded in the Rex-Werner Lake area, 50 km northwest of Kenora, in 1948 (Assessment Files, Resident Geologist's Office, Kenora). Subsequently, between 1963 and 1969, 4223 ounces of platinum and 32 230 ounces of palladium were produced at the Gordon

Lake copper-nickel mine from 1 325 115 tons milled. At Rex-Werner Lake, Carlson (1958) demonstrated that a steeply northerly dipping fault, trending N75°TE, separated massive granitic rocks to the south from paragneisses to the north. Discontinuous lenses of peridotite, pyroxenite, and hornblendite occur along the fault. Carlson (1958) interpreted the lenses to be plugs which were forcefully intruded into the banded amphibolite host rock.

In 1952 and 1956 respectively, Eastern Mining and Smelting and Quebec Nickel Corporation reported values of up to 0.75 ounces per ton for precious metals encountered in drill core. For many of these assays it is uncertain whether values reported refer to platinum group elements alone, or to combined precious metals, including gold and silver. Values were reported in both ultramafic and footwall paragneiss units. Many of the former base metal properties in this area are held under patent, including the past-producing Gordon Lake Mine of Consolidated Canadian Faraday Limited, and Falconbridge Nickel Company Limited's Werner Lake cobalt mine. Recent assays on grab samples taken from dump material at the former Norpax Oils and Mines nickel-copper prospect by the present claim holder (J.D. McCannell, consultant geologist, personal communication, 1986) indicate combined platinum-palladium values up to 7210 ppb, comprising 210 ppb Pt and 7000 ppb Pd.

The spatial relationship of mafic-ultramafic intrusive bodies emplaced around the margins of the Atikwa Batholith, combined with the knowledge that some of them are known to be layered, for example the Mulcahy Lake intrusion, and the upper part of the Nabish Lake intrusions, suggests that these bodies could host platinum group elements. Sutcliffe (1984, 1985) suggested, by analogy with the position of platinum-bearing zones in the Bushveld, Stillwater, and other layered ultramafic to mafic intrusions, that the boundary between the Lower and Middle Zone of the Mulcahy Lake intrusion warranted exploration for platinum. This led to the staking in early 1986 of a block of 36 claims over this transition, and a further 16 claims over copper and nickel occurrences in the Lower Zone. To date, no platinum values have been recorded (Assessment Files, Resident Geologist's Office, Kenora). Other ultramafic to mafic intrusions around the margins of the Atikwa Batholith, particularly those that are known to host copper-nickel occurrences such as the Nabish Lake, Trapp Lake, and Denmark Lake bodies, warrant exploration for platinum.

A third type consists of zoned or multiply intruded ultramafic to mafic ovoid bodies located within granitic batholiths, similar to the Lac des Iles body, 80 km north of Thunder Bay. The tadpole-shaped Entwine Lake intrusion, within the Irene-Eltrut Lakes Batholithic Complex, is composed of pinkish diorite, in the "tail" while the "head" of the intrusion is anorthositic gabbro, with a small peridotite body in the middle (Davies 1964). An amphibolitic rim of basaltic composition occurs discontinuously around the intrusion. Sulphide occurrences close to the margins of the intrusion consist of pyrite and pyrrhotite, and a chalcopyrite occurrence (Davies 1965). The chalcopyrite occurrence was drilled by Noranda Exploration Company Limited in 1973 to 1974. Pyrite, pyrrhotite, and chalcopyrite are reportedly disseminated, and also in blebs up to 2 mm, in amounts estimated from 1 to 2% total sulphides. Epidotization and bleaching of the gabbro are commonly reported to accompany the sulphide mineralization, as well as uralitization of augite in some sections (Assessment Files, Resident Geologist's Office, Kenora). There is no record of any assay for platinum group elements. A much smaller ultramafic-mafic intrusion occurs along Highway 71 at Caliper Lake. There is no record of any exploration having been done on this body, and little is known about its petrogenesis. Given the ease of access, a search for sulphides within it is warranted. However, a grab sample recently taken by the author from an ultramafic phase along the highway ran 18 ppb platinum and 17 ppb palladium (Geoscience Laboratories, Ontario Geological Survey, Toronto).

In the Fort Frances-Mine Centre area, two large layered sills, the Grassy Portage gabbro and the Bad Vermilion gabbro-anorthosite, have recently been described by Poulsen (1984). The Grassy Portage intrusion is crudely layered, amphibolitized, and faces toward the southeast. A gabbro to melagabbro at the base passes upward into a leucogabbro to anorthositic phase, in turn overlain by a biotitic ferrodiorite that is locally garnetiferous, and in turn overlain by a melagabbro to metadiabase phase. Podiform copper-nickel occurrences at the base include Noranda Mines Limited's past-producing Northrock Mine, and the Belacoma Prospect. One sample recently taken by the senior author from each of these properties indicated geochemical levels of enrichment in both cases: a sample from the Northrock Mine dump ran 460 ppb gold, 150 ppb platinum, and 240 ppb palladium, and a sample taken from an outcrop at the Belacoma Prospect ran 160 ppb gold, 115 ppb platinum, and 73 ppb palladium (Geoscience Laboratories, Ontario Geological Survey, Toronto). A profile of samples taken by the senior author across the sill in the road cut on Highway 11, gave results of <2 ppb gold, <1 to 1 ppb platinum, and <1 to 1 ppb palladium. No sampling has yet been carried out by the authors in the Bad Vermilion sill.

The Dobie Township intrusion, 40 km west of Fort Frances, is comprised of coarse-grained diabasic gabbro, medium-grained hypersthene gabbro, and norite (Fletcher and Irvine 1955). Grab samples recently taken by the senior author from the Young-Corrigan copper-nickel occurrence, at the southwestern corner of the body, gave no indication of geochemical enrichment in platinum or palladium (<1 ppb platinum, <1 ppb palladium, Geoscience Laboratories, Ontario Geological Survey, Toronto).

Synvolcanic differentiated sills in the Lake of the Woods and Kakagi-Rowan Lakes greenstone terrains have not to date indicated significant potential for copper-nickel sulphide associations, and therefore may not be targets for platinum exploration. However, mention is made of the Gabbro Lake sill at Boyer Lake. McMaster (1975) mapped four major zones within the southern limb of the 600 m thick sill. From north to south, these are a diabasic chilled margin phase of pyroxene-plagioclase gabbro, a leucocratic zone of olivine-pyroxene-plagioclase gabbro, a pyroxenitic zone, and a pegmatitic zone of pyroxene-plagioclase gabbro (Blackburn 1981b). Minor amounts of chalcopyrite were encountered within the sill close to its southern contact, by Massval Mines Limited, in a 1959 diamond drill program (Assessment Files, Resident Geologist's Office, Kenora). No nickel mineralization has been encountered, however. Other gabbroic sills in the area may also be layered. These include the Mountdew Lake gabbro, the Washeibemaga Lake gabbro, and gabbros and peridotites near Secret Lake (Blackburn 1981b).

The structural control on mafic to ultramafic plugs in the Rex-Werner Lake area may bear some similarity to the Quetico Fault zone close to Atikokan, where MacTavish (*in* Patterson *et al.* 1985, 1986) documented syntectonic mafic to ultramafic intrusions, ranging from hornblende leucogabbro to hornblendite with occasional pyroxenitic zones along a 25 km long zone south of the fault. MacTavish has interpreted the intense shearing along the edges of the intrusions to indicate syntectonic emplacement. Cumulate layering and pegmatitic textures locally occur in the bodies, and net-textured sulphides, including pyrrhotite and chalcopyrite, are reported. Most notable among these occurrences are the Abiwin and Kawene Occurrences, from which values of 1.15 ounces platinum and 0.11 ounce palladium, and 230 to 1100 ppb platinum and 260 to 1100 ppb palladium, respectively, have been reported (MacTavish *in* Patterson *et al.* 1985, 1986).

Further west, along the western extension of the Quetico Fault beneath the heavily drift covered Rainy River area, aeromagnetic maps indicate several ameboid-shaped anomalies. Several of these are related to iron formation or to known gabbroic plugs. However, in one instance, the anomaly is coincident with a previously unmapped outcrop of coarse leucogabbro in Worthington Township; similar bodies may occur elsewhere. The potential for mineralization in this area is little known, but may be enhanced by overburden drilling studies to be conducted by the Ontario Geological Survey in 1987 to 1988.

In conclusion, it should be noted that information on platinum group elements within Kenora Mining Division is scant. Most copper-nickel occurrences hosted by mafic-ultramafic intrusions have not reportedly been assayed in the past for platinum group elements; these are particularly amenable to sampling.

DIAMOND–DRILL CORE STORAGE PROGRAM

The drill core library building was completed and occupied at the end of February 1986; the official opening was held on June 20, 1986. The library serves three mining divisions in northwestern Ontario: Kenora, Patricia, and Red Lake.

Core collected during 1986 came primarily from the Kenora Mining Division. A total of 13 500 m of core has been collected from all three mining divisions and moved to the core library. From this a total of 11 350.6 m has been fully catalogued and stored in the building, as of November 30, 1986. The remainder consists of excess core from several drilling projects that is in dead storage, and core still being processed. An additional 3500 m of core is in temporary storage at Red Lake, and 25 000 m at Sioux Lookout, for future removal to the library.

Use of the core library grew rapidly during the fall of 1986. A total 71 exploration industry personnel visited the facility. Of these, eleven examined core and four carried out sampling programs. Four group tours were given, including two from local school classes, Junior Rangers and a group of local residents. The school and Junior Ranger groups were given brief geology and mineral exploration lectures.

The core in the library consists of entire drill holes from both exploration and mine development drilling and short samples of core submitted for credit under Section 77(6) of the Mining Act (Revised Statutes of Ontario 1980). Core collected to date has been largely from gold exploration projects occurring drilled within the last five years except for the following exceptions: three holes in the Mine Centre Area drilled by Hanna Mining Limited in 1975 during base metal exploration; four development holes from the Werner Lake Nickel Mine of Consolidated Canadian Faraday Limited, a known platinum bearing deposit; and one hole from a uraniferous pegmatite in MacNicol Township. Representative holes from a large base metal program by Noranda Exploration Incorporated in metavolcanic remnants in the English River Subprovince could be of interest to persons carrying out exploration or research projects in this relatively understudied area. Core has been obtained that intersects gold deposits in the Cameron-Rowan Lake area, in particular a type hole from the Nuinsco Resources Cameron Lake Deposit. Core sections of it are on permanent display in the visitor's area at the core library. In addition, core from gold deposits at Mine Centre, Straw Lake, Western Peninsula of Lake of the Woods, and the Manitou Lake-Kawashegamuk Lake area, is available.

Response to the core library program by the exploration industry has been very favourable. Several company geologists have examined previously drilled core from deposits they were currently investigating. In a number of cases, these examinations have indicated major inconsistencies between the drill logs from the Assessment Files, and rock types and mineralization actually present in the core. This has commonly led to a more optimistic interpretation of the deposit concerned, and encouraged further exploration.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

During the 1986 field season, the following field parties from the Engineering and Terrain Geology, Precambrian Geology, and Mineral Deposits Sections operated within the Kenora Mining Division:

A. Bajc (Engineering and Terrain Geology Section) commenced surficial geological mapping in the Fort Frances-Rainy River area (Figure 1.2, Location A).

J.A. Ayer (Precambrian Geology Section) continued detailed mapping (1:15 840) in northern Lake of the Woods, in the Clearwater Bay area (Figure 1.2, Location B).

M.G. Morrice (Precambrian Geology Section) commenced detailed mapping (1:15 840) in the

TABLE 1.4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

KENORA MINING DIVISION
SYMBOLS AND ABBREVIATIONS

Amag - Airborne Magnetometer Survey
AEM - Airborne Electromagnetic Survey
ARe - Airborne Resistivity
Ag - Silver
Assess - Assessment Work
Au - Gold
BM - Base Metals
Cu - Copper
DD - Diamond Drilling (where shown, the number following "DD" indicates the number of holes drilled and the total length drilled respectively)

EM - Electromagnetic Survey
Geochem - Geochemical Survey
Geophys - Geophysical Survey
GL - Geological Survey or Report
HLEM - Horizontal Loop Electromagnetic Survey
IP - Induced Polarization
Li - Lithium
Litho Chem - Lithogeochemical

Mag - Magnetometer Survey
Manual - Manual Work
Mech - Mechanical
MS - Monumental Stone
OMEP - Ontario Mineral Exploration Program
OVD - Overburden Drilling
Pt - Platinum
SA - Sampling, Assaying
STr - Stripping
Tr - Trenching
Zn - Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Atikwa Lake	52F/05 NE	Canadian Nickel Company Ltd.	Au	Assess	EM, Mag, VLF	1986	2.9258	FF-3
Atikwa Lake	52F/05 NE	Knox, William, T.	Au	Assess	EM	1985	2.9018	BB-2
Atikwa Lake	52F/05 NE	Sheridan, J.P.	Au	Assess	DD 1-898',SA	1985	2.8791	HH-1
Aubrey Township	52F/10 NW	Hoban, Michael J.		Assess	STr	1986	-	DD-7
Aubrey Township	52F/10 NW	Kidd Creek Mines Ltd.	Au	assess	EM, Mag, SA	1985-86	2.9287 2.9288	TT-2
Aubrey Township	52F/10 NW	Kidd Creek Mines Ltd.		Assess	EM, Mag	1985-86	2.9091	TT-1
Avery Township	52F/09 NW	Noranda Expl. Co. Ltd.	Au	Assess	Mag, VLF	1986	2.9077	M-2
Avery Township	52F/09 NW	Noranda Exploration Co. Ltd.	Au	Assess	GL	1986	2.9371	M-3
Avery Township	52F/09 NW	Noranda Exploration Company	Au	Assess	SA	1985	2.8889	M-1
Avery Township	52F/09 NW	Noranda Exploration Company	Au	Assess	STr	1986	-	M-4
Avery Township	52F/09 NW	Selco Mining Corp. Ltd.	Au	Non Assess	DD 11-850'	1980	-	L-1
Bad Vermilion Lake	52C/10 NE	Cor'p. Falconbridge Copper	Au	Assess	DD 4-1486'	1986	-	SS-1
Bad Vermilion Lake	52C/10 NE	McCormick, Alan	Au	Assess	EM, Mag	1986	2.9528	TT-1
Bad Vermilion Lake	52C/10 NE	Mine Centre Gold Venture Inc	Au	Assess	Tr, STr	1985	-	RR-1
Bad Vermilion Lake Little Turtle Lake	52C/10 NE 52C/15 SE	P.I.R.P. Holdings Inc.	Au	Assess	DD 2-825.2'	1985	-	MM-7
Bad Vermilion Lake Little Turtle Lake	52C/10 NE 52C/15 SE	P.I.R.P. Holdings Inc.	Au	OMEP	Geophys	1982	63.4188	MM-8
Bad Vermilion Lake	52C/10 NE	Steep Rock Resources Inc.	BM, Au	Assess	EM, Mag	1986	2.9016	NN-3
Bennett Township Bennett Lake	52C/16 SE 52C/16 SW	Lynx Canada Explorations Ltd	Au,Zn,Cu	OMEP	EM, Mag, Geochem Surv	1983	63.4319	B-5
Bliss Lake	52C/10 NW	Corporation Falconbridge	BM	Assess	DD 3-2741'	1985	-	W-2
Bliss Lake	52C/10 NW	Corporation Falconbridge	BM	assess	DD 16-10570	1985/86	-	W-4
Bliss Lake	52C/10 NW	Corporation Falconbridge	BM, Au	Assess	DD 3-4674'	1986	-	W-5
Bliss Lake	52C/10 NW	Homestake Explorations Ltd.	Au	Assess	GL,SA	1985	2.8606	X-1
Bluffpoint Lake	52F/03 NW	Bolen, John (Jack)	Au	Assess	EM,Mag,GL	1985	2.8048	G-1
Bluffpoint Lake	52F/03 NW	Consolidated Silver Standard	Au	Assess	EM,Mag	1986	2.9274	R-1
Bluffpoint Lake	52F/03 NW	Corporation Falconbridge	Au	Assess	STr	1985	-	O-6
Bluffpoint Lake	52F/03 NW	Pitkanen, David A.	--	Assess	Manual	1985	-	P-1
Bluffpoint Lake (Straw	52F/03 NW 52F/03 NE 52F/03 SW	Sparton Resources Inc.	Au	OMEP	DD 5-1,593', IP, Geol.	1983	63.4293	W-2
Bluffpoint Lake Area	52F/03 NW	Corporation Falconbridge	Au	Assess	SA	1985	-	O-7
Boyer Lake	52F/07 NE	Esso Resources Canada		Assess	Mag	1986	2.9203	MM-2

TABLE 1.4 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Boyer Lake	52F/07 NE	Gold Washe Ltd.	Au	Assess	EM, Mag, VLF-EM, GL	1985	2.8632	SS-1
Boyer Lake	52F/07 NE	Hall, Evald Monty	Au	Assess	HLEM	1985	2.8696	NN-2
Boyer Lake	52F/07 NE	Hall, Evald Monty		Assess	STr	1986	-	NN-3
Boyer Lake	52F/07 NE	Noranda Exploration Co. Ltd.		Assess	Mag	1986	2.9269	UU-1
Bridges Township	52F/13 SE	Rio Algom Exploration Inc.		Assess	EM	1985	2.9352 2.9353	B-3
Bridges Township	52F/13 SE	Rio Algom Exploration Inc.	BM	Assess	DD 1-346'	1986	-	B-2
Brooks Lake	52F/04 NE	Bissett, John (Pleno Mines)	Au	Assess	EM, Mag	1986	2.9415	W-1
Brownridge Township Iealand Township	52F/15 SE	Sanmine Explorations Inc.	Au,Ag,BM	Assess	SA, STr	1985	2.8488	R-12
Brownridge Township	52F/15 SE	Tantalum Mining Corporation	Li	OMEP	Geochem	1982	62.4148	T-2
Buchan Bay	52F/11 NE	Pollock, John	Au	Assess	GL	1984	2.8827	DD-2
Buchan Bay	52F/11 NE	Raleigh Minerals Limited	Au	Assess	GL	1985	2.8401	I-6
Buchan Bay	52F/11 NE	Tasu Resources Ltd.	Au	Non Assess	DD 5-1481.4'	1983	-	AA-3
Code Township	52E/09 SE	Goldstreet Resources Ltd.	Au	Assess	DD 8-3088'	1985	2.8672	W-2
Code Township	52E/09 SE	Goldstreet Resources Ltd.	Au	Assess	GL	1985	2.8698	W-1
Code Township	52E/09 SE	Knox, William T.	Au	Assess	EM, GL, VLF, Mag	1985	2.9144	U-3
Code Township	52E/09 SE	Roberecki, Ed	Au	Assess	Manual, SA, STr	1985	-	O-3
Code Township	52E/09 SE	Roberecki, Ed	Au	Assess	Trenching	1985	2.8812	O-4
Code Twp	52E/09 SE	Knox, William, T.		Assess	GL	1985	2.8816	U-2
Contact Bay	52F/10 NW	Kidd Creek Mines Ltd.		Assess	EM,Mag	1986	2.9350	TT-3
Docker Township Vermilion Bay	52F/13 SE 52F/14 SW	Nelson, Carter	MS	Assess	Mech, STr	1986	-	N-2
Docker Township	52F/14 SW	Nelson, Carter B.	MS	Assess	STr,Tr	1986	-	L-3
Dogpaw Lake Rowan Lake	52F/05 SW 52F/05 SE	Canadian Nickel Co. Ltd.	Au	Assess	DD 3-3038.9'	1985	-	C-10
Dogpaw Lake Heronry Lake	52F/05 SW 52F/04 NW	Canadian Nickel Co. Ltd.	Au	Assess	SA	1985	2.8607	C-9
Dogpaw Lake	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	GL	1985	2.8545	PPP-1
Dogpaw Lake	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	DD 10-3920'	1985	-	PPP-2
Dogpaw Lake	52F/05 SW	Dunfrazier Gold Expl. Inc.	Au	Assess	SA, Litho Chem, GL	1985-86	2.8912	PPP-3
Dogpaw Lake	52F/05 SW	FGM Management & Gold Corp.	Au	Assess	DD 1-160'	1986	-	NNN-2
Dogpaw Lake	52F/05 SW	Falconbridge Limited	Au	assess	DD 3-1023.7'	1984-85	-	G-5
Dogpaw Lake	52F/05 SW	Gold Fields Canadian Mining	Au	Assess	GL	1983	2.8911	XX-2
Dogpaw Lake	52F/05 SW	LaFleche, Gerald	Au	Assess	EM, GL	1986	2.9290	EEE-5
Dogpaw Lake	52F/05 SW	Lafleche, Gerald	Au	Assess	Man, Mech,Tr	1985	-	EEE-3
Dogpaw Lake	52F/05 SW	Lafleche, Gerald	not known	Assess	EM	1985	2.8951	EEE-4
Dogpaw Lake	52F/05 SW	Metallgesellschaft Can. Ltd.	BM	Assess	DD 6-10,654'	1985	-	QQQ-1
Dogpaw Lake	52F/05 SW	Proteus Resources Inc.	Au	Assess	AEM, AMag	1985	2.8644	OOO-1
Dogpaw Lake	52F/05 SW	Proteus Resources Inc.	Au, Ag, Cu	Assess	GL, SA	1985	2.8685	OOO-2

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Dogpaw Lake	52F/05 SW	Proteus Resources Inc.	Au	Assess	DD 14-5500'	1986	-	OOO-3
Ewart Township	52E/11 NE	Busch, David J.	Au	Assess	GL	1985	2.8648	NN-3
Ewart Township	52E/11 NE	Roberecki, Joel	Au	Assess	Manual Work, STr	1985/86	-	LL-3
Factor Lake	52C/09 NE	Kroocao, David		Assess	Tr	1986	-	B-6
Garnet Bay	52F/11 NW	Mistango Cons. Resources Ltd	Au	Assess	DD 2-500'	1986	-	W-3
Halkirk Township	52C/11 NE	Armstrong, George	BM	OMEP	DD 6-3092'	1983	63.4283	A-10
Halkirk Township	52C/10 NW 52C/11 NE	Corp. Falconbridge Copper	BM	Assess	DD 1-813'	1985	-	W-3
Halkirk Township	52C/10 NW	Cousineau, Louis	Au	Assess	STr	1986	-	U-4
Halkirk Township	52C/11 NE	Kidd Creek Mines Ltd.	BM	assess	DD 2-664'	1986	-	GG-3
Harper Lake Lower Manitou Lake	52F/07 NW 52F/07 SW	St. Joe Canada Inc.	Au	Assess	DD 1-391'	1985	-	H-11
Harper Lake Lower Manitou Lake	52F/07 NW 52F/07 SW	St. Joe Canada Inc.	Au	Assess	DD 6-899'	1985	-	H-12
Harper Lake Lower Manitou Lake	52F/07 NW 52F/07 SW	St. Joe Canada Inc.	Au	Assess	DD 5-1128'	1985	-	H-13
Haycock Township	52E/16 SW	Clark, G.	Au	Assess	Mech	1985	-	X-9
Haycock Township	52E/16 SW	Clark, G., J. Doty,	Au	Assess	EM	1985	2.8771	X-8
Haycock Township	52E/16 SW	Karwacki, John		Assess	GL	1986	-	X-10
Haycock Township	52E/16 SW	Nault, Pierre	MS	Assess	DD 5-250'	1986	-	FF-1
Haycock Twp	52E/16 SW	Zebruck, George	Au	Assess	GL	1985	2.8909	EE-1
Heronry Lake	52F/04 NW	Canadian Nickel Company Ltd.	Au	Assess	DD 3-2862.8'	1986	-	D-6
Heronry Lake Dogpaw Lake Brooks Lake	52F/04 NW 52F/04 NE 52F/05 SW	Martin, D. J.	Au	OMEP	GL	1982	63.4152	R-3
Jaffray Township	52E/16 SW	Boise Cascade Canada Ltd.	Au	Assess	DD 5-1762.5'	1985	-	BB-4
Jaffray Township	52E/16 SW	Boise Cascade Canada Ltd.	Au	Assess	IP	1985	2.8762	BB-5
Jaffray Township	52E/16 SW	Boise Cascade Canada Ltd.	Au	Assess	GL	1985	2.8525	BB-3
Jaffray Township	52E/16 SW	Boise Cascade Canada Ltd.	Au	Assess	GL	1985	2.8859	BB-6
Jaffray Township	52E/16 SW	Kennco Explorations, (Can.)	Au, Ag, Cu Zn	Assess	GL	1985	2.8574	DD-2
Kawashegamuk Lake	52F/08 NW	Kozowy, Alexander	Au	Assess	DD 5-2786', SA	1986	2.9163	X-2
Kirkup Township Jaffray Township	52E/09 NW 52E/16 SW	Hood, William C.	Au	Assess	EM, GL	1985	2.8407	CCC-1
Kirkup Township	52E/09 NW	Kidd Creek Mines Ltd.		Assess	STr, GL	1985	-	BBB-2
Laval Township	52F/14 SW	Billiton Canada Ltd.	Au	Assess	GL	1985	2.8677	V-1
Line Lake	52F/11 SW	Redden, J.W.	MS, Cu, Ni Pt	Assess	EM	1985-86	2.9224	G-1
Little Turtle Lake	52C/15 SE	Federal Kirkland Mines Ltd.	Au	Assess	EM, Mag	1986	2.8974	DD-1
Little Turtle Lake	52C/15 SE	Pitkanen, R.	Au, BM	OMEP	Geological	1982	63.4204	S-6
Little Turtle Lake	52C/15 SE	Pitkanen, R.	Au	OMEP	Report	1981	63.4098	B-7
Lobstick Bay	52F/05 NW	BP Resources Canada Limited	Au	Assess	DD 8-3370'	1985	-	N-9
Lobstick Bay	52F/05 NW	BP Resources Canada Limited	Au	Assess	EM, Mag	1985	2.8503	N-8
Lobstick Bay	52F/05 NW	Martin, Jack B.	Au	Assess	STr, Tr, SA	1985	-	P-1
Lobstick Bay	52F/05 NW	Martin, Jack, D.	Au	Assess	EM, Mag	1985	2.8784	P-2

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lower Manitou Boyer Lake Harper Lake	52F/07 SW 52F/07 NW 52F/07 NE	Cochrane Oil and Gas Ltd.	Au	Assess	EM, Mag, VLF, GL	1984-85	2.8195	X-4
Manross Township	52E/09 SW	Roberecki, Ed	Au	Assess	Manual, STr	1985	-	D-4
Melgund Township Tabor Lake	52F/09 SW	Sulpetro Minerals Ltd.	Au	Assess	DD 4-1436'	1985	-	CC-7
Napanee Lake	52F/03 NE	Black Gold Oil and Gas Ltd.	Au	Assess	EM, Mag	1985	2.8512	P-1
Napanee Lake	52F/03 NE	Silver Lake Resources Inc.	Au	Assess	Geochem	1984-86	2.9008	E-4
Napanee Lake Vista Lake	52F/03 NE 52F/03 SE	Sparton Resources Inc.	Au	Assess	EM,Mag,GL	1984/85	2.8530	K-5
Paterson Lake	52L/07 SE	Sparton Resources Inc.	Au, Sph	Assess	GL,SA	1985	2.8573 2.9087	K-1
Phillips Twp. Turtle Lake Dogpaw Lake	52E/08 SE 52E/01 NE 52F/05 SW	Wasabi Resources Ltd.	Au	Assess	AEM, AMag	1986	2.9110	E-3
Rex Lake	52L/07 NE	Noranda Exploration Co. Ltd.	Cu	Assess	EM, Mag, GL	1985	2.9062	D-1
Rex Lake	52L/07 NE	Noranda Exploration Co. Ltd.	Cu, Zn, Ag	Assess	Assays	1985	2.9284	D-2
Rickaby Lake	52L/11 NE	Busch, David J.	Au	Assess	GL	1985	2.9051	L-2
Rickaby Lake	52L/11 NE	Busch, David J.	Au, Cu, Zn	Assess	SA	1985/86	2.9051	L-4
Rickaby Lake	52L/11 NE	Busch, David J.	Au	Assess	STr	1985	-	L-3
Rowan Lake	52F/05 SE	Bigstone Minerals Ltd.	Au	Assess	DD 15-3589', GL, Mag	1986	-	KKK-4
Rowan Lake	52F/05 SE	D.K. Platinum Corp. Ltd.	Au	Assess	EM, Mag	1986	-	EEE-3
Rowan Lake Lawrence Lake	52F/05 SE 52F/06 SW	Falconbridge Limited	Au	Assess	DD 2-801'	1985	-	L-3
Rowan Lake	52F/05 SE	Falconbridge Limited	Au	Assess	DD 4-1100'	1986	-	L-4
Rowan Lake	52F/05 SE	Gold Fields Can. Mining Ltd.	Au	Assess	GL	1983	2.8877	LL-3
Rowan Lake	52F/05 SE	Gold Fields Can. Mining Ltd.	Au	Assess	GL	1983	2.8928	LL-4
Rowan Lake	52F/05 SE	Great Central Mines Limited	Au	Assess	AEM, AMag	1985	2.8801	OOO-1
Rowan Lake	52F/05 SE	Hucanolan Resources Ltd.	Au	assess	GL, OVD 3-217'	1986	2.9220	PPP-1
Rowan Lake	52F/05 SE	Nuinsco Resources Limited	Au	OMEP	DD 12-5310', GL, EM, Mag	1983	63.4309	JJ-11
Rowan Lake	52F/05 SE	Nuinsco Resources Limited	Au	OMEP	DD 62-58383' Geol Rpts	1982-84	63.4288	JJ-12
Rowan Lake	52F/05 SE	Nuinsco Resources Ltd.	Au	assess	DD 6-2535'	1986	-	JJ-13
Rowan Lake	52F/05 SE	Regan, Vincent F.	Au	Assess	EM, Mag, GL	1985	2.8440	X-2
Rowan Lake	52F/05 SE	Rosenthal, Alex	Au	Assess	DD 1-126'	1986	-	CCC-3
Rowan Lake	52F/05 SE	Soteroplos, Theodore	Au	Assess	GL	1986	2.9527	RR-2
Rowan Lake	52F/05 SE	Youngman, Bruce A.	--	Assess	AEM, AMag	1985	2.8579	LLL-2
Rowan Lake Area	52F/05 SE	Bigstone Minerals Ltd.	Au, Ag, BM	Assess	SA, GL	1984	2.8948	KKK-3
Shoal Lake Echo Bay	52E/10 SW 52E/10 NW	Hansen, J. E.	Au	Assess	GL	1985/86	2.9325	LL-3
Snowshoe Bay Shoal Lake	52E/11 SE 52E/10 SW	Consolidated Professor Mines	Au, Ag, BM	OMEP	DD 4-1394.4' GL, EM,Mag	1983	63.4287	B-3
Swan Lake	52L/02 SW	Nault, Pierre	MS	Assess	DD 14-453'	1986	-	B-1
Turtlepond Lake Tabor Lake Satterly Township	52F/10 SE 52F/09 SW	Kasner, R. J.	Au	Assess	AEM,AMag,ARe	1986	2.9418	CC-1
Turtlepond Lake	52F/10 SE	Sovereign, William John	Au	Assess	SA	1986	2.9432	Y-5

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wapageisi Lake	52F/08 SW	Kozowy, Alexander	Au	Assess	GL	1985	2.8712	K-1
Wapageisi Lake	52F/08 SW	Kozowy, Alexander	Au	Assess	AMag, AEM	1985	2.8643	K-2
Watten Township Halkirk Township	52C/11 NE 52C/10 NW	Kidd Creek Mines	BM	Assess	GL	1985	2.8944 2.8945	OO-4
Watten Township	52C/11 NE	Kidd Creek Mines Ltd.	BM	Assess	Mag,VLF,HLEM	1985	2.8744	OO-1
Watten Township	52C/11 NE	Kidd Creek Mines Ltd.	BM	Assess	GL	1985	2.8881	OO-2
Watten Township Halkirk Township	52C/11 NE 52C/10 NW	Kidd Creek Mines Ltd.	BM, Au	Assess	EM, Mag	1985/86	2.9107	OO-5
Wiley Bay	52E/10 SE	Marbank Minerals Inc.	Au	Assess	Man Work, STr, Tr	1985	-	P-1
Wiley Bay	52E/10 SE	Mountain Lake Resources Inc.	Au	Assess	STr	1986	-	G-1
Wonderland Lake	52L/01 SE	Nault, Pierre	HS	Assess	DD 8-297'	1986	-	A-1

Northwest Angle Inlet area of the western Lake of the Woods (Figure 1.2, Location C).

M. Sanborn (Precambrian Geology Section) commenced a study of the structural geology of the northern Lake of the Woods area (Figure 1.2, Location D).

B.R. Berger (Precambrian Geology Section) conducted detailed mapping (1:15 840) in Avery, McAree, and MacFie Townships northeast of Dinorwic. In conjunction with this work L.B. Chorlton (Mineral Deposits Section) commenced a study of the mineral occurrences in the same area (Figure 1.2, Location E).

S. Bucke and D.R. Melling (Mineral Deposits Section) conducted separate studies of the gold deposits and mineralization in the Rowan-Kakagi Lakes area (Figure 1.2, Location F).

P.M. Smith (Mineral Deposits Section) conducted a detailed study of the geological setting of the Mikado Gold Mine, Shoal Lake and continued study of the Duport Mine and other Shoal Lake gold occurrences (Figure 1.2, Location G).

The above projects are part of the Canada-Ontario Mineral Development Subsidiary Program (COMDA), which is a subsidiary agreement of the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario.

In addition to these projects, G.W. Johns (Precambrian Geology Section) completed a multi-year synthesis of the geology of the Rowan-Kakagi Lakes area (1:50 000) (Figure 1.2, Location H).

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

As of the end of November 1986, designated OMEP programs by 17 companies or individuals, and on which a total of $1.5 million of assistance is anticipated, were operative in Kenora Mining Division.

RESEARCH BY OTHER AGENCIES

UNIVERSITY THESES

P.M. Smith continued a study of the geological setting of the Duport Mine of Consolidated Professor Mines Limited, at Shoal Lake (M.Sc. candidate, University of Waterloo).

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

D.R. Melling and D.H. Watkinson conducted studies of the geological setting and genesis of the Cameron Lake gold deposit (Grant 193).

ONTARIO EXPLORATION TECHNOLOGY DEVELOPMENT PROGRAM

D.N.H. Horler, J.A. Ostrowski, and D.R. Melling conducted a study into the development of geobotanical remote sensing technology, using the Cameron Lake gold exploration area as a base (Grant 112).

OTHER RESEARCH

D. Cowan commenced 1:50 000 Quaternary mapping of NTS 52F. This program is being carried out under the federal component of the Canada-Ontario Mineral Development Agreement (COMDA).

Mineral exploration programs were carried out on several Indian Reserves by Jean Louis Causse of Indian Minerals (East) of Resources Economic and Employment Development (REED), federal government of Canada.

S. Shirey of the Carnegie Institution of Washington conducted research in the Fort Frances area.

G.R. Edwards and D.W. Davis carried out research in the Atikwa Batholith under the auspices of the Ontario Geological Survey.

Professor H.C. Palmer, University of Western Ontario continued rock magnetic studies in the Mulcahy Lake intrusion, near Eagle Lake.

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2. Red Lake Resident Geologist Area, Northwestern Region

M.J. Lavigne Jr.[1] and B.T. Atkinson[2]

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[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Red Lake.

INTRODUCTION

Exploration activity in the Red Lake Mining Division continues at near record-setting levels. A predictable pattern of the type of activity has evolved. As the result of numerous claims recorded in 1984, geophysical surveys submitted for assessment work credits were high in 1985. Drilling was also high in 1985, and higher again in 1986. A reflection of this trend can be seen in Table 2.2; however, much of the drilling activity in 1986 will not be filed for assessment work credits, as much of it is on patented or leased claims and properties which have had sufficient assessment credits recorded.

The focus of current exploration activity is again in the Red Lake Greenstone Belt and the Birch-Confederation Lakes Belt. Much of the activity consists of reevaluating small past producers and well-known prospects where underground development has occurred. Prior to 1986, most exploration programs in the Red Lake Mining Division have been financed by large mining companies. In 1986, flow-through share financing has made an important contribution to the level of exploration.

RESIDENT GEOLOGIST STAFF ACTIVITIES

In 1986, the office of the Resident Geologist was staffed by M.J. Lavigne Jr., Resident Geologist; B.T. Atkinson, Resource Geologist; R.P. Seyler, Compilation Geologist; C.A. Krueger, Clerk; and A. Tims and S. Stock, Geological Assistants.

Preparations for GOLD '86 were a major activity for M.J. Lavigne Jr, involving outcrop stripping, detailed mapping, guidebook production, and also coauthorship of a paper in the proceedings volume. Field trips for industry geologists were numerous. B.T. Atkinson spent a week in the McInnes Greenstone Belt documenting mineralization. R.P. Seyler is producing Geological Data Inventory Folios for the McVicar and Birch-Confederation Lakes Greenstone Belts. He also spent one week in the McVicar Belt documenting mineralization. S. Stock began compiling geochemical geochemical data and A. Tims began a mineral deposit file.

A table of occurrences, prospects, past producers, and mines visited by the staff of the Red Lake Resident Geologist's Office in 1986 is given in Table 2.1.

MINING ACTIVITY

Gold is now the only metal currently being mined in the Red Lake Mining Division, since the Griffith Mine terminated operations on April 1st, 1986. From 1968 to 1986 the mine produced 22 850 000 tons of pellets and concentrates. The plant and all equipment have been sold to a liquidation firm. The open pits are being allowed to flood.

Campbell Red Lake Mines Limited is expected to produce 227 000 ounces of gold from 391 000 tons, all from above the 21st level. Development on the 22nd and the 23rd levels is in progress, while the 24th, 25th, 26th, and 27th levels are inactive. Proven reserves remain at 2 288 000 tons grading 0.615 ounce gold per ton. Employment level has increased to 460 people due to the conversion of underground mining methods to 80 percent cut and fill.

Production at the Dickenson-Sullivan Joint Venture continues to increase. The mine produced 64 081 ounces of gold from 239 736 tons of ore at an average grade of 0.32 ounce per ton. This figure does not include gold from sulphide concentrates (3836 ounces). Current proven reserves stand at 1.16 million tons grading 0.34 ounce per ton. Production at the year end was approximately 800 tons per month. The work force in 1986 consisted of 300 employees.

As the result of this and previous year's underground exploration programs, Goldquest Exploration Incorporated shipped 2586 tons of ore from the Abino Minesite to the A.W. White Mine.

EXPLORATION ACTIVITY

Three underground exploration projects were active in the Red Lake area in 1986. Jamie Frontier Resources Incorporated continued their surface and underground program at the Mt. Jamie Minesite. A bulk sample stock pile is now being built up; much of the material coming from the newly discovered North C zone, near the No. 1 shaft. Underground development has accessed this zone, which yields 0.49 ounce gold per ton over a 146 foot (44.5 m) strike length and 4 foot (122 cm) mining widths. Current proven reserves are 35 000 tons grading 0.65 ounce gold per ton and total reserves (proven, probable, and geological) are 80 000 tons grading 0.497 ounce gold per ton. Road access to the minesite was terminated as the result of Red Lake Fire No. 7 which burnt 150 000 acres of timber which was to be accessed by a road under construction at the time of the fire. Negotiations for road construction are now underway with the Ministry of Northern Development and Mines and several other resource users in the area.

Goldquest Exploration Incorporated dewatered the decline at the Abino Minesite. A new target was explored by 900 feet (275 m) of drifting and 6000 feet (1830 m) of diamond drilling with discouraging results. However, more than 2586 tons of ore, including muck from 1983 development, was shipped to the A.W. White Mine.

At the McFinley Minesite, activities were suspended pending further financing after completing approximately 800 feet (244 m) of drifting and 8000 feet (2440 m) of drilling by the end of February 1986. Late in 1986, underground development resumed in preparation for the the removal of extensive bulk

TABLE 2.1: IN 1986, THE FOLLOWING OCCURRENCES, PROSPECTS, PAST PRODUCERS, AND MINES WERE VISITED BY THE STAFF OF THE RED LAKE RESIDENT GEOLOGIST OFFICE.

1.	Cominco Occurrence, McInnes Lake	Au,Cu,Zn
2.	Phelps Dodge, McInnes Lake	Cu,Zn,Pb
3.	Shonia Lake Prospect, McVicar Lake	Au
4.	Chellew Gold Mines Ltd. Occurrence, McVicar Lake	Au
5.	Hoey Syndicate Occurrence, McVicar Lake	Cu,Ni
6.	McVicar Lake Prospect, McVicar Lake	Cu,Ni,Pt,Pd
7.	B.P. Resources Occurrence, North Spirit Lake	Au
8.	MacDonell Prospect, North Spirit Lake	Au,Pb,Zn,Au
9.	Dickenson Mines Ltd. Prospect, North Spirit Lake	Fe
10.	Crown Trust Prospect, North Spirit Lake	Fe
11.	Peridotite Bay Prospect, North Spirit Lake	Fe
12.	Williamson Occurrence, Avis Lake	Au
13.	Bertram Property, Fly Lake	Au,Cu,Zn
14.	Durham (1965) Occurrence, Bateman Twp.	Au
15.	Bounty Red Lake, Developed Prospect (Skookum Bay), Dome Twp.	Au
16.	Rowan Claims-Martin Bay Occurrence, Todd Twp.	Au
17.	Alcourt Prospect, Fairlie Twp.	Au
18.	Altura Gold Mines Ltd., Developed Prospect, Fairlie Twp.	Au
19.	Minorex Ltd. Occurrence, Fairlie Twp.	Au
20.	Ultra Mines and Energy Ltd. Property, Fairlie Twp.	Au
21.	Para Red Lake Occurrence, Fairlie Twp.	Au
22.	Red Lake Area Gold Occurrence, Fairlie Twp.	Au
23.	Drawson Red Lake Occurrence, Fairlie Twp.	Au
24.	Coin Lake Occurrence, Fairlie Twp.	Au
25.	Consolidated Fulbro Occurrence, McDonough Twp.	Au
26.	Cochenour-Slate Bay Occurrence, McDonough Twp.	Au
27.	Redcon Prospect, Balmer Twp.	Au
28.	Kaymac Prospect, Dome Twp.	Au
29.	Chukuni Peterson Property, Heyson Twp.	Au
30.	Mt. Jamie Mine (Past Producer), Todd Twp.	Au
31.	McFinley, Developed Prospect, Bateman Twp.	Au
32.	Buffalo Mine, (Past Producer), Heyson Twp.	Au
33.	Campbell Red Lake Mine, Producer, Balmer Twp.	Au
34.	A.W. White, Producer, Balmer Twp.	Au

samples which will be processed by an on-site mill, to be constructed in early 1987.

In other areas, some very encouraging results from surface diamond drilling programs were produced in 1986. A summary of exploration activity in 1986 can be found on Table 2.2. and can be located on Figures 2.1a and 2.1b. Published results include some from the Nexus Resource Corporation-St. Joe Canada Incorporated joint venture on their Horseshoe Island Prospect on Birch Lake, where hole #86-43 intersected grades of 0.20 ounce gold per ton over 40.29 feet (12.28 m). Other holes were equally impressive (Northern Miner, October 13, 1986, p.22). North of Birch Lake, near Richardson Lake, Golden Terrace Resources Corporation drilled near a shaft which was sunk by the Kostynuk Brothers of Red Lake in 1963 on a high grade vein. Recent drilling results indicate grades of 0.353 ounce gold per ton over 4.6 feet (140 cm) and 0.3 ounce gold per ton over 4 feet (122 cm) in the first hole and 0.173 ounce gold per ton over 28 feet (853 cm) including 0.29 ounce gold per ton over 11 feet (335 cm) in hole #2. A third hole returned values of 0.1 ounce gold per ton over 10 feet (305 cm).

Other drilling in the northwestern quadrant of the Birch-Confederation Lakes Belt includes that by Noranda Incorporated, Dome Mines Limited, Goldfields Mining Corporation, and Kidd Creek Mines Limited (Falconbridge Limited).

In the western Red Lake area, drilling on the Tylox-Noranda joint venture has produced some encouraging results. Some of the results indicate 0.75 ounce gold per ton over 1.5 m in hole #NT-86-14 and 0.14 ounce gold per ton over 1.54 m in hole #NT-86-13 (George Cross News Letter, September 29, 1986).

RECOMMENDATIONS FOR EXPLORATION

Due to the high level of exploration activity, most of the obvious, previously known gold occurrences and prospects are being explored. Many areas of high potential still remain dormant. One of these areas is the centre of the Red Lake Camp, largely covered by Red Lake. An area within a 5 km radius, centred just east of Whitehorse Island and the Cable Prospect, (Figures 2.2 and 2.3) has produced 11.5 million ounces of gold. This area, despite being surrounded by past producers, has not received thorough exploration. It is bound to the east by the Campbell Red Lake Mine, to the north by the Cochenour-Willans Mine and the Howey Mine to the south (Figure 2.2). The only focused exploration was at the Cable Prospect, where 175 000 tons grading 0.2 ounce gold per

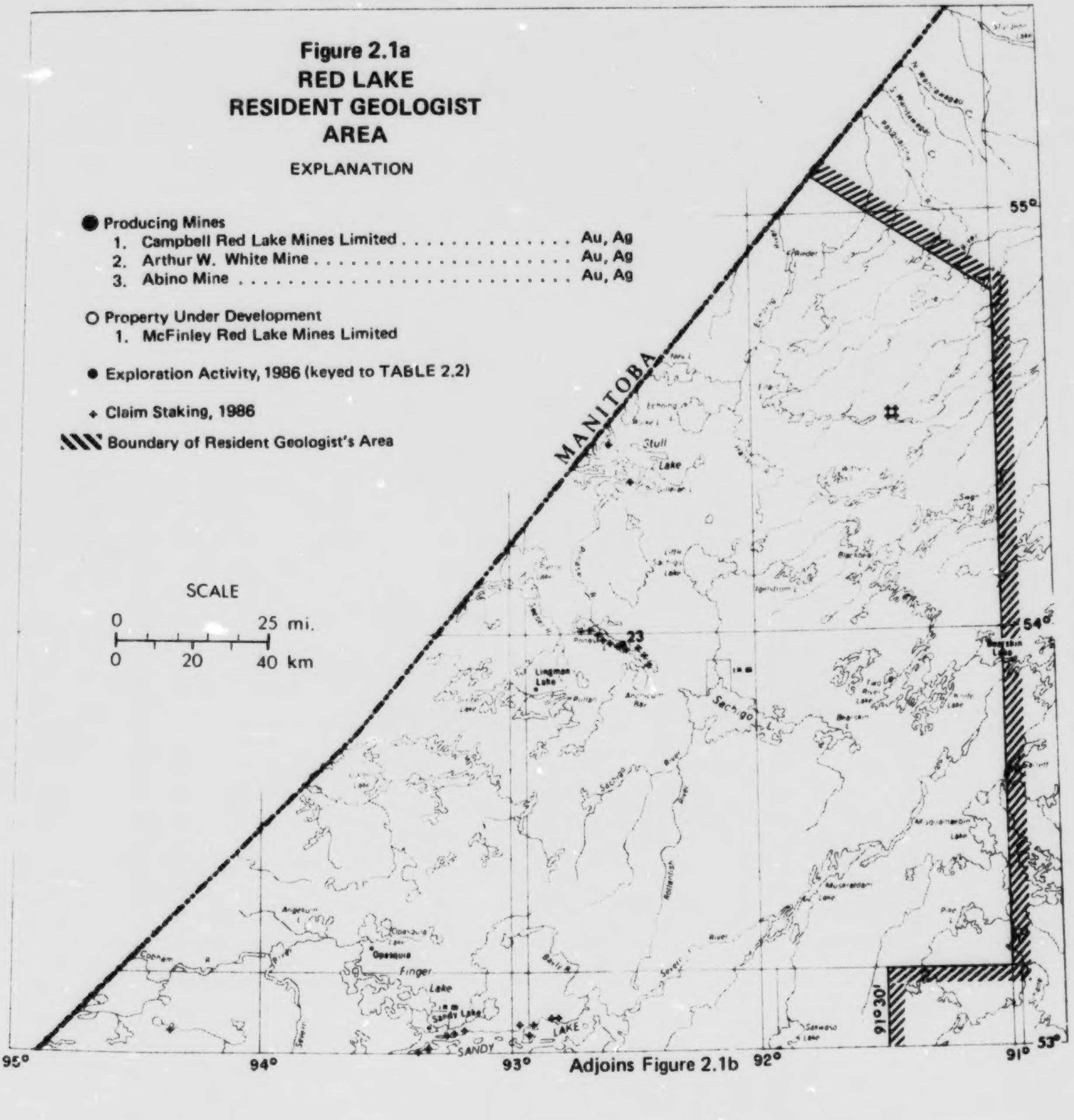


Figure 2.1a
RED LAKE
RESIDENT GEOLOGIST
AREA

EXPLANATION

● Producing Mines
1. Campbell Red Lake Mines Limited . . . . Au, Ag
2. Arthur W. White Mine . . . . Au, Ag
3. Abino Mine . . . . Au, Ag

○ Property Under Development
1. McFinley Red Lake Mines Limited

• Exploration Activity, 1986 (keyed to TABLE 2.2)

+ Claim Staking, 1986

▨ Boundary of Resident Geologist's Area

SCALE
0
25 mi.
0
20
40 km
MANITOBA
Stull
Lake
Little Sachigo Lake
Ponask
23
Lingman Lake
Sachigo L.
Sachigo River
Finger
Lake
Opasquia
Sandy Lake
SANDY
LAKE
Severn
River
55°
54°
53°
95°
94°
93°
92°
91°
91°30'

Adjoins Figure 2.1b

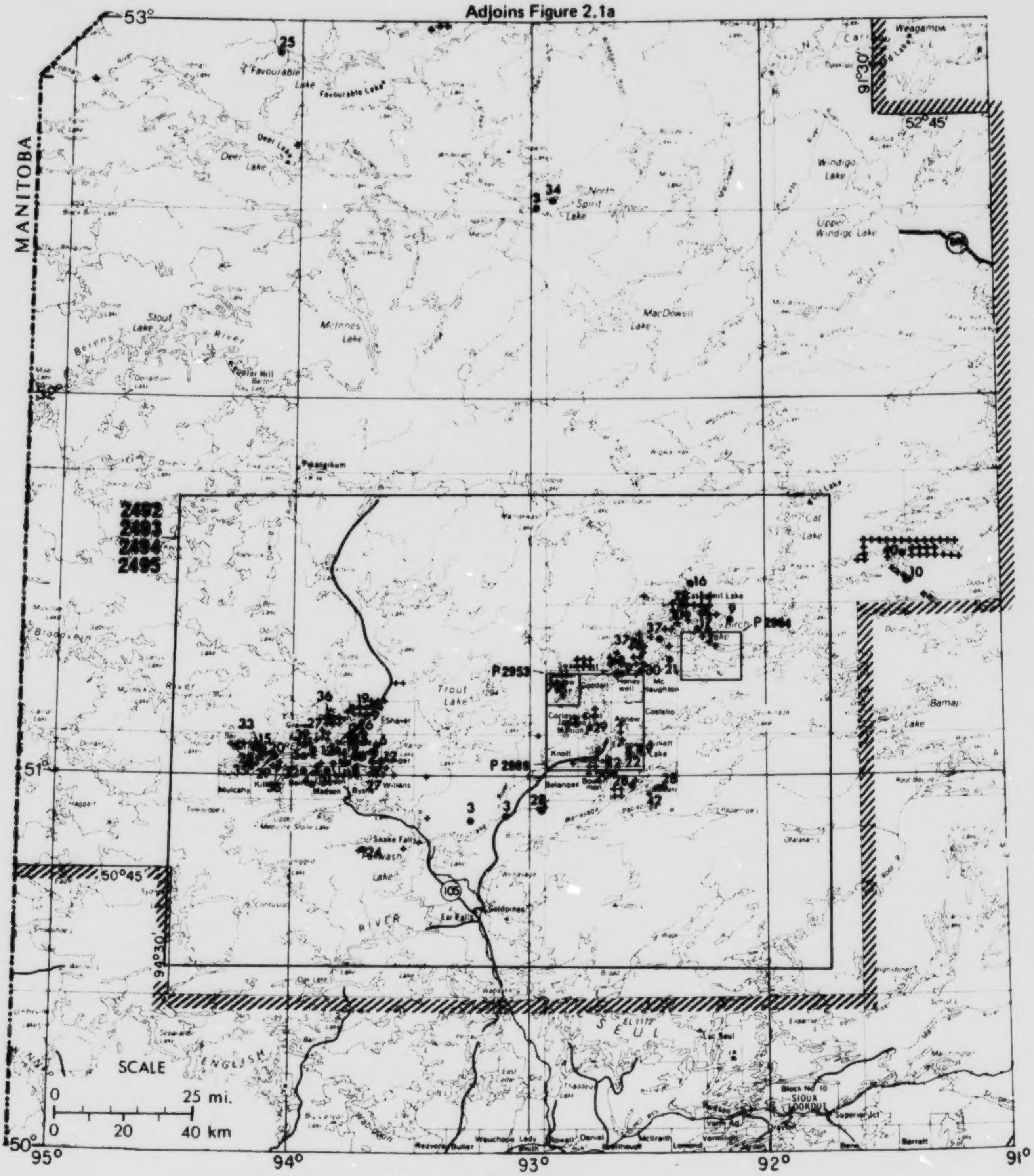

Adjoins Figure 2.1a
53°
MANITOBA
Favourable Lake
Deer Lake
North Spirit Lake
Windigo Lake
Upper Windigo Lake
MacDowell Lake
McInnes Lake
Stout Lake
Berens River
52°45'
91°30'
Weagamow
Pikangikum
2492
2493
2494
2495
Trout Lake
P 2953
P 2964
P 2966
Birch Lake
Cat Lake
Bamaji Lake
50°45'
93°30'
Pakwash Lake
River
105
Ear Falls
Goldpines
Red Lake
Lac Seul
SIOUX LOOKOUT
SCALE
0
25 mi.
0
20
40 km
English River
51°
50°
95°
94°
93°
92°
91°

Figure 2.1b
RED LAKE
RESIDENT GEOLOGIST
AREA

For explanation refer to figure 2.1a, page 35

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2.2

Number on Figure	Individual or Company	Activity
1	AUPAN RED LAKE RESOURCES LTD.	DIAMOND DRILLING (2)-550'; DOME TWP.
2	BERTRAM, ANDY	STRIPPING AND TRENCHING; MITCHELL TWP.
3	BP RESOURCES CANADA LTD.	GEOPHYSICAL SURVEYS; SOUTH OF OTTER LAKE, GERRY LAKE AND BUCKETT LAKE MAP SHEETS DDH(1)-381'; GERRY LAKE
4	CANHORN MINING CORP.	GEOLOGICAL SURVEY; BAIRD TWP.
5	CHEVRON MINERALS LTD.	GEOLOGICAL SURVEY, 550 SAMPLES FOR LITHOGEOCHEMICAL ANALYSIS AND LACUSTRINE GEOCHEMICAL SAMPLING; FAIRLIE TWP.
6	COMINCO LTD.	DDH(3)-1300'; BALMER TWP.
7	CRONLEY, R.B.	STRIPPING AND TRENCHING; SKINNER TWP.
8	DESMEULES, G.	TRENCHING; SHABUMENI LAKE MAP SHEET
9	DOME EXPLORATION (CANADA) LTD.	GEOLOGICAL, GEOCHEMICAL, GEOPHYSICAL SURVEYS AND 6,115 METRES DIAMOND DRILLING ON THE CANAMER PROPERTY, KEIGAT LAKE: 762 METRES DIAMOND DRILLING; BATEMAN TWP.: GEOLOGICAL, GEOPHYSICS AND GEOCHEMICAL SURVEYS; SWAIN LAKE, CORLESS TWP. AND EARNGEY TWP.
10	DURATION MINES LTD./WILSHIRE ENERGY RESOURCES LTD.	AIRBORNE AND GROUND GEOPHYSICAL SURVEYS AND 2,000 METRES (APPROX.) DIAMOND DRILLING; MCVICAR LAKE AND MEEN LAKE MAP SHEETS
11	EASTMONT GOLD MINES LTD.	TRENCHING, MAGNETOMETER AND ELECTROMAGNETIC SURVEYS ON THE BATHURST MINE; SKINNER TWP.
12	ELDOR RESOURCES LTD.	HUMUS SAMPLING AND TEST PITTING ON THE GULLROCK PROPERTY; BALMER TWP.
13	ESSO MINERALS CANADA	DIAMOND DRILLING AND STRIPPING AT THE COCHENOUR WILLANS MINE; DOME TWP.
14	GABBS RESOURCES LTD.	GEOPHYSICAL SURVEYS; CASUMMIT LAKE MAP SHEET
15	GIBSON, ROBERT	DDH(9)-944 FEET; TODD TWP.
16	GOLDEN TERRACE RESOURCES CORP.	3,400 HUMUS SAMPLES, GEOLOGICAL SURVEYS AND DIAMOND DRILLING; CASUMMIT LAKE AND BROWNSTONE LAKE MAP SHEETS
17	GOLDFIELDS CANADIAN MINING LTD.	GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL SURVEYS; CASUMMIT, SATTERLY, KEIGAT AND SEAGRAVE LAKE MAP SHEETS: STRIPPING AND DIAMOND DRILLING ON THE SPRINGPOLE PROPERTY; CASUMMIT LAKE MAP SHEET
18	GOLDQUEST EXPLORATION INC.	288 HOURS POWER STRIPPING, GEOPHYSICAL SURVEYS INCLUDING MAGNETOMETER, ELECTROMAGNETIC AND I.P. ON THE REDCON, CLICKER AND ABINO PROPERTIES; BALMER, BATEMAN, AND DOME TWP.: DETAIL GEOLOGICAL MAPPING AND LITHOGEOCHEMICAL SAMPLING: DIAMOND DRILLING INCLUDING: PROPERTY — TWP. — NO. OF HOLES — FOOTAGE ABINO — BALMER — 8 — 6,817 REDCON — BALMER — 18 — 12,880 TOTAL: 26 — 19,697 MINING ACTIVITIES INCLUDED DEWATERING OF THE ABINO SHAFT, 887 FEET OF CROSS-CUTTING AND DRIFTING, 5,951 FEET UNDERGROUND DRILLING, AND TREATMENT OF 2,586 SHORT TONS OF ORE.
19	HERBERT, LARRY	POWER STRIPPING, TRENCHING; BATEMAN TWP.
20	JAMIE FRONTIER RESOURCES INC.	UNDERGROUND EXPLORATION AND DEVELOPMENT ON THE MOUNT JAMIE MINE; TODD TWP. INCLUDING 500 FEET OF DRIFTING AND CROSS-CUTTING AND 19 DRILL HOLES TOTALLING 7204': SURFACE EXPLORATION ON SITE INCLUDED DDH(49)-8,865 FEET, AND OVERBURDEN STRIPPING AT BOTH THE #1 AND #2 SHAFTS.
21	KIDD CREEK MINES LTD. (FALCONBRIDGE LTD.)	DIAMOND DRILLING (8)-1,673' ON THE LOYDEX OPTION AND MCKENZIE RED LAKE PROPERTIES; SATTERLY LAKE MAP SHEET.
22	LAC MINERALS LTD.	DIAMOND DRILLING 2,400 METRES (APPROX.) ON THE UCHI PROPERTY; EARGNEY TWP.
23	LAKE PONASK GOLD CORP.	DIAMOND DRILLING (19)-6,964 FEET AND GEOPHYSICAL SURVEYS; PONASK LAKE MAP SHEET
24	MACIEJEWSKI, TONY	PROSPECTING AND LITHOGEOCHEMICAL SAMPLING; DIXIE LAKE MAP SHEET
25	MASSIVE ENERGY LTD.	MAGNETOMETER AND I.P. SURVEYS AND DIAMOND DRILLING (6)-3,032'; BORLAND LAKE MAP SHEET
26	MCFINLEY RED LAKE MINES LTD.	UNDERGROUND DEVELOPMENT WORK ON THE MCFINLEY MINE, BATEMAN TWP. INCLUDING 800 FEET OF DRIFTING AND 8,000 FT (APPROX.) DIAMOND DRILLING
27	NORAMCO EXPLORATIONS INC.	AIRBORNE AND GROUND GEOPHYSICAL SURVEYS, PROSPECTING, GEOLOGICAL AND GEOCHEMICAL SURVEYS; MCDONOUGH, FAIRLIE, DOME, BALMER, BATEMAN AND BYSHE TWP.
28	NORANDA EXPLORATION CO. LTD.	DIAMOND DRILLING (10)-781 METRES ON THE NEWMAN PROPERTY; TODD TWP.: DDH(12)-1,188 METRES AND TAILINGS SAMPLING ON THE JASON MINE; CASUMMIT LAKE MAP SHEET: GEOLOGICAL AND GEOPHYSICAL SURVEYS; AVIS LAKE, GERRY LAKE MAP SHEETS AND SLATE LAKE MAP SHEETS: DDH(2)-793 METRES; GERRY LAKE MAP SHEET.

TABLE 2.2 Continued

Number on Figure	Individual or Company	Activity
29	OROFINO RESOURCES LTD.	GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEYS AND DIAMOND DRILLING ON THE JACKSON MANION PROPERTY; DENT TWP. AND THE EARNGEY PROPERTY; EARNGEY TWP: GEOLOGICAL SURVEYS ON THE REDCREST PROPERTY; TODD TWP.
30	PARFLOW MINES AND ENERGY CORP.	GEOPHYSICAL, GEOLOGICAL AND GEOCHEMICAL SURVEYS ON THE SOL D'OR MINE; SHABUMENI LAKE MAP SHEET
31	PETERSON, CHARLES W.	POWER STRIPPING ON THE CHUKUNI RIVER PROPERTY; HEYSON TWP.: POWER STRIPPING AND LEGAL SURVEY ON EIGHT CLAIMS, SKOOKUM BAY PROPERTY; DOME/HEYSON TWP.
32	REDAURUM RED LAKE MINES LTD.	GEOLOGICAL MAPPING, TRENCHING AND DIAMOND DRILLING ON THE REDAURUM, REDRUTH AND HUMLIN PROPERTIES; BAIRD AND FAIRLIE TWPS.
33	RIVARD, O'BRIEN	60 FEET DIAMOND DRILLING; TODD TWP.
34	ROCKSPAN RESOURCES LTD.	GEOPHYSICAL SURVEYS AND DIAMOND DRILLING (3)-1,150 FEET; BUCKETT LAKE MAP SHEET
35	SHANE RESOURCES LTD.	SAMPLING AND LINECUTTING ON WEST RED LAKE PROPERTY; BALL TWP.
36	SHERRITT GORDON MINES LTD.	AIRBORNE GEOPHYSICAL SURVEY; FAIRLIE AND DOME TWP.
37	ST. JOE CANADA INC.	GEOLOGICAL SURVEYS ON SWAIN LAKE AND SOUTHWEST BAY PROPERTIES; SHABUMENI AND SATTERLY LAKE MAP SHEETS: AIRBORNE GEOPHYSICAL SURVEY; CASUMMIT LAKE, SATTERLY LAKE AND SHABUMENI LAKE MAP SHEETS: DIAMOND DRILLING 11,750 METRES (APPROX.) ON HORSESHOE ISLAND PROSPECT; SATTERLY AND CASUMMIT LAKE MAP SHEETS.
38	SOLTERMAN, RENE	PROSPECTING AND SAMPLING; TODD TWP.
39	ULTRA MINES AND ENERGY CORP.	GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL SURVEYS; FAIRLIE TWP.
40	UTAH MINES LTD.	GEOLOGICAL MAPPING, GEOPHYSICAL SURVEYS, PROSPECTING AND DIAMOND DRILLING (18)-1,900 METRES; MCVICAR LAKE AND STOUGHTON LAKE MAP SHEETS
41	VEINOTT , CARL	DIAMOND DRILLING (1)-102 FEET; CASUMMIT LAKE MAP SHEET
42	WILLIAMSON, GERRALD	PROSPECTING AND SAMPLING; AVIS LAKE AND LITTLE BEAR LAKE AND KNOTT TWP. MAP SHEETS

ton was defined above the 375-foot (114 m) level. Some drilling was done to the north of, but none to the south of, the Cable Prospect. This area is considered by the authors to have a high mineral potential, not only because of the Cable Prospect, but because it is underlain by the Flat Lake-Howey Bay Deformation Zone, the host to five past producing gold mines (*see* Figure 2.2). Of particular importance is the orientation of the deformation zone in the Howey Bay area. As seen on Figure 2.2, the regional orientation of the deformation zone is 060°. Since movement on this zone is left-handed, any segment of the deformation zone which is oriented in between 060° and 000°(i.e. left-stepping) is an area of dilatancy. The Madsen Mine (the third largest producer in the Red Lake Camp) and the Starratt-Olsen Mine are found along such a left-handed step, shown on Figure 2.2. The segment of the deformation zone in the Howey Bay area is oriented at 010°, thus left-stepping. This segment is, therefore, a zone of regional dilation and must be considered to be a viable exploration target area. In addition, the area is in the eastern pressure shadow of the Dome Stock, which has undergone north-south compression. Thus the combination of two regional favourable structural elements, a healthy gold prospect, and inadequate exploration in the centre of a major gold camp, are all factors indicating the high gold potential of the Howey Bay area (Figure 2.3).

Another area with high gold potential is the southern contact zone of the large felsic porphyry between Snib and Florin Lakes (Figures 2.2 and 2.3). This contact is not only a wide mylonite zone, one of many zones which define the Flat Lake-Howey Bay Deformation Zone (Hugon and Schwerdtner 1984) but is also a zone of intense alteration. Recent mapping and geochemical analysis by M.J. Lavigne Jr. found intense K_20 metasomatism accompanied by high gold values in the rocks immediately south of the porphyry contact in the Snib Lake area. One grab sample ran 3900 ppb gold. The host lithology to the anomalous gold values is a black, siliceous, aphanitic, strongly foliated rock, containing numerous quartz veinlets; the grab sample was veinlet free. No primary textures are preserved in these rocks due to intense shearing and alteration. High Zr, Y, and SiO_2, accompanied by low Cr and Ni, indicate a rock of rhyolitic composition. This is supported by thin section observations of abundant potassium feldspar. The rocks in this highly altered contact zone range in composition from basaltic to rhyolitic, based on immobile element content, but based on major element content, one can easily assume that compositional variation is due to alteration only. A sample from the margin of a zone of brick red alteration contains 5.81 percent K_2O; higher values could be expected in the core of the alteration.

In summary, the complexity produced by alteration, deformation, and mixed primary lithologies, in conjunction with high gold values, make the southern contact of this porphyry a 3 km-long, previously unexplored gold target.

In terms of gold exploration, the southern margin of the Birch-Confederation Lakes Greenstone Belt has received very little attention. The southern boundary is the English River Subprovince, and the northern boundary, being more transitional, is defined by the change from northerly striking stratigraphy, as found in Confederation Lake, to westerly striking stratigraphy, which is found in a 12 km wide ban north of the Uchi-English River Subprovince's boundary (Figure 2.1, centred on Property 42). This westerly strike was most likely the result of ductile transposition of lithological units near the subprovince boundary at amphibolite grades of metamorphism, resulting in high strain zones, such as the Sydney Lake Cataclastic Zone. Gold mineralization is expected to be

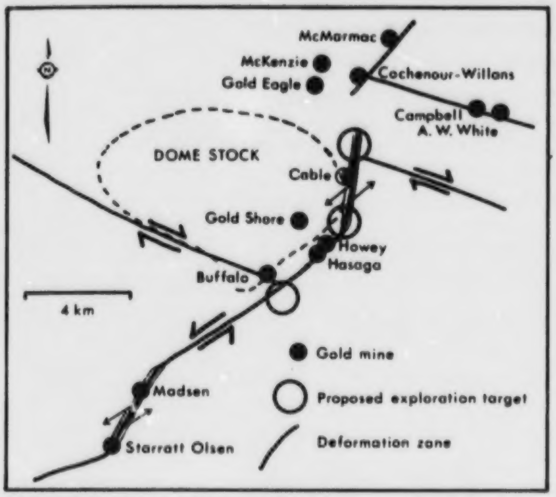

McMarmac
McKenzie
Gold Eagle
Cochenour-Willans
Campbell
A. W. White
DOME STOCK
Cable
Gold Shore
Howey
Hasaga
Buffalo
4 km
Madsen
Starratt Olsen
Gold mine
Proposed exploration target
Deformation zone

Figure 2.2 Regional Structural Elements, Gold Mine Locations, and Proposed Exploration Targets, Red Lake Greenstone Belt.

dominantly of the impregnation type, such as disseminated sulfide zones. This type of mineralization, being a nontraditional target, could have easily been overlooked by prospectors. Several recent discoveries in the Papaonga-Curie Lakes area, recently mapped by R.P. Bowen (Bowen 1984), support this. The geology can best be described as mixed mafic and felsic metavolcanics, which include pyroclastic rocks and clastic metasediments composed of volcanic detritus and common oxide facies banded iron formation. Granitoid intrusions are also common. Recent discoveries include several by Getty Mines Limited in between Papaonga and Curie Lakes. Results from trench sampling indicate gold values of 0.11 ounce per ton over 0.5 m, 0.33 ounce per ton over 0.5 m, and 0.01 ounce per ton over 2.5 m. A grab sample from the southern shore of Papaonga Lake ran 0.06 ounce gold per ton and a showing on the eastern shore of Maskooch Lake ran 320 ppb gold over 0.5 m. Most of these occurrences consist of sulphide mineralized zones in metasediments.

More recently, Gerry Williamson, a prospector from Ear Falls, discovered a mineralized shear zone in mafic metavolcanics west of Maskooch Lake (Property 42, Table 2.2 and Figure 2.1a, 2.1b). A grab sample collected by B.T. Atkinson ran 3.2 ounces gold per ton. The grab sample by G. Willliamson ran 0.9 ounce gold per ton. The mineralization is 2 m in width.

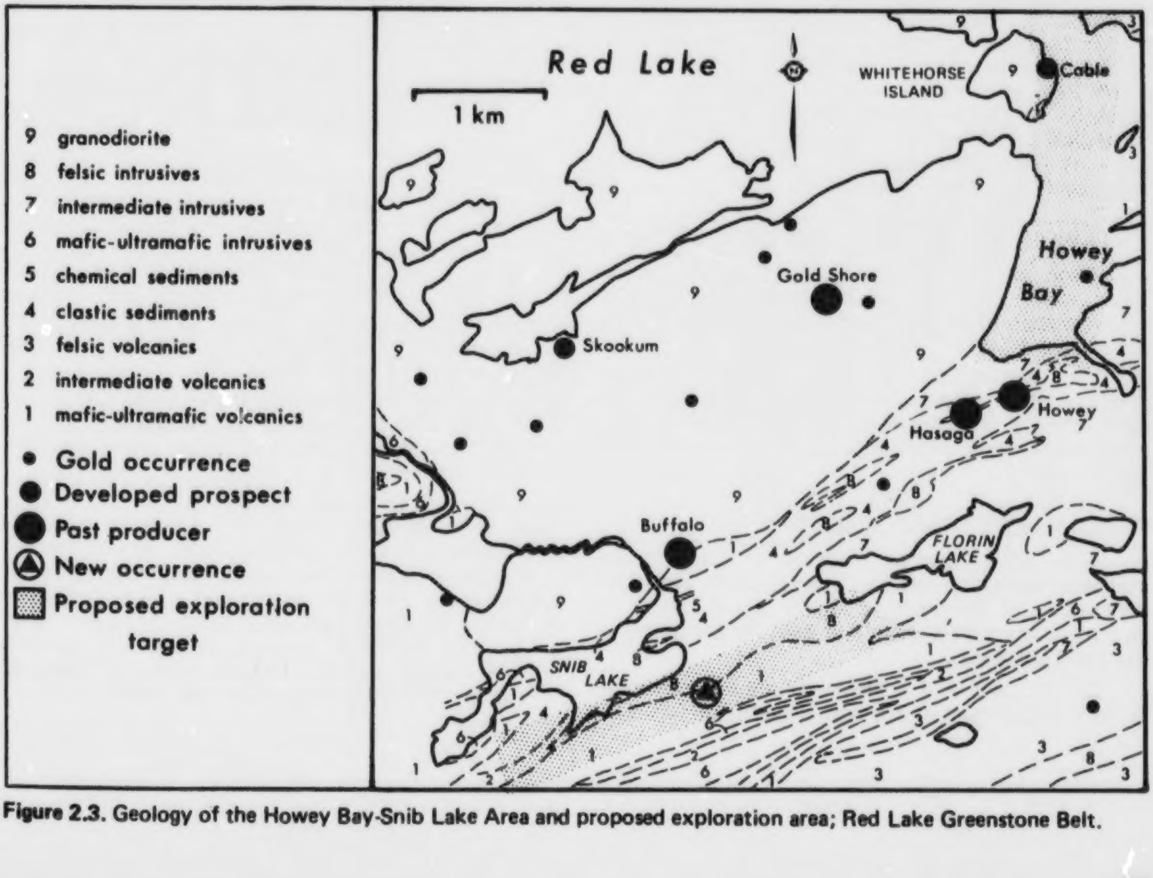

9 granodiorite
8 felsic intrusives
7 intermediate intrusives
6 mafic-ultramafic intrusives
5 chemical sediments
4 clastic sediments
3 felsic volcanics
2 intermediate volcanics
1 mafic-ultramafic volcanics
● Gold occurrence
● Developed prospect
● Past producer
▲ New occurrence
▨ Proposed exploration target
Red Lake
1 km
WHITEHORSE ISLAND
Cable
Howey Bay
Gold Shore
Skookum
Hasaga
Howey
Buffalo
FLORIN LAKE
SNIB LAKE

Figure 2.3. Geology of the Howey Bay-Snib Lake Area and proposed exploration area; Red Lake Greenstone Belt.

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 2.3

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1986	3, 803	1, 598	10, 427	48, 325	127, 445	6, 360	189, 633
1985	2, 673	2, 260	8, 212	42, 000	201, 052	16, 642	269, 262
1984	4, 344	1, 725	7, 799	32, 588	78, 538	12, 495	128, 664
1983	2, 407	1, 204	5, 180	18, 637	22, 035	3, 468	53, 207
1982	942	1, 884	3, 992	23, 967	79, 662	6, 787	118, 775
1981	1, 719	1, 249	4, 889	28, 771	66, 000	8, 182	107, 430
1980	2, 220	1, 115	4, 301	38, 482	30, 240	871	71, 975
1979	1, 068	1, 763	3, 221	21, 108	38, 380	3, 154	62, 949
1978	1, 207	1, 521	3, 916	25, 574	19, 496	2, 480	50, 997
1977	2, 324	2, 395	4, 261	12, 994	45, 080	620	59, 196
1976	2, 705	1, 382	4, 332	18, 680	23, 578	380	46, 544
1975	1, 368	2, 059	2, 957	29, 377	12, 714	960	44, 717
1974	1, 339	1, 829	3, 648	47, 362	5, 660	3, 040	57, 719
1973	1, 616	3, 157	4, 009	60, 027	20, 474	NIL	83, 019
1972	2, 219	5, 284	5, 588	34, 261	14, 858	5, 216	56, 173
1971	1, 541	4, 922	8, 486	73, 019	50, 920	2, 243	127, 556
1970	3, 971	7, 194	11, 759	73, 886	329, 065	17, 606	427, 527
1969	10, 999	933	14, 772	49, 212	66, 032	1, 320	119, 039
1968	2, 451	1, 702	4, 784	15, 367	48, 800	1, 228	65, 395

In summary, the potential for undetected, nontraditional, nonfissure-filling types of gold mineralization in the areas of higher metamorphic grade, south of the gold-rich Birch-Confederation Lakes Greenstone Belt, and numerous recent discoveries as a result of limited exploration, coupled with favourable geological parameters (i.e. high strain, structural traps such as folded banded iron formation), make this area highly suitable for exploration.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

A.J. Fyon and L. O'Donnel completed the second field season of a two-year program studying gold mineralization in the Confederation, Bathurst, and Fly Lake areas (Fyon and O'Donnell 1986).

G.P. Beakhouse and D.J. Good continued 1:15 840 scale mapping in the Birch Lake area. An area which is the equivalent of eight townships has now been mapped (Beakhouse and McNeil 1986, Good 1986).

RESEARCH BY OTHER AGENCIES

P. Layer (University of Toronto) is doing paleomagnetic studies in the Red Lake area. D. McMaster (University of Toronto) is doing Ar/Ar dating of plutons, supracrustal rocks and gold mineralization in the Red Lake area.

Both P. Layer and D. McMaster are supervised by D. York, Department of Physics, Univerity of Toronto.

SELECTED REFERENCES AND RECENT PUBLICATIONS

Bowen, R.P.
: A Geology of the Slate Lake Area, District of Kenora (Patricia Portion); Ontario Geological Survey, Open File Report 5471, 163p. and 4 maps in back pocket.

Beakhouse, G.P., and McNeil, A.M.
1986: Geology of the Northwestern Birch Lake Area, District of Kenora (Patricia Portion); p.20-24 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p.

Bowen, R.P.
1984: Geology of the Slate Lake Area, District of Kenora (Patricia Portion); Ontario Geological Survey Open File Report 5471, 163p. and 4 maps in back pocket.

Fyon, J.A., and O'Donnell, L.
1986: Regional Strain State and Alteration Patterns Related to Gold Mineralization in the Uchi-Confederation-Woman Lakes Area; p.266-275 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p.

TABLE 2.4 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM	AIRBORNE ELECTROMAGNETIC SURVEY	IP	INDUCED POLARIZATION SURVEY
AG	SILVER	L-GEOCHEM	LITHOGEOCHEMICAL SURVEY
AMAG	AIRBORNE MAGNETOMETER SURVEY	MAG	MAGNETOMETER SURVEY
ASSESS	ASSESSMENT	OMEP	ONTARIO MINERAL EXPLORATION PROGRAM
AU	GOLD	OVD	OVERBURDEN DRILLING
BS	BENEFICIATION STUDY	PEM	PULSE ELECTROMAGNETIC SURVEY
DDH	DIAMOND DRILL HOLE (NO) FOOTAGE	rTr	BEDROCK TRENCHING
EM	ELECTROMAGNETIC SURVEY	SA	SAMPLING
GEOCHEM	GEOCHEMICAL SURVEY	Str	STRIPPING
GL	GEOLOGICAL SURVEY	VLF-EM	VERY LOW FREQUENCY EM SURVEY
HLEM	HORIZONTAL LOOP ELECTROMAGNETIC SURVEY	UG	UNDERGROUND EXPLORATION

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ANCHICUM BAY PONASK LAKE	53F/16 53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	MAG, VLF-EM	1986	2.9486	63-86
AVIS LAKE GERRY LAKE	52K/16 52K/14	GETTY CANADIAN METALS LTD.	AU	ASSESS	GL	1984	2.7521	71-84
AVIS LAKE CURIE LAKE ROADHOUSE RIVER SLATE LAKE	52K/16 52K/16 52J/13 52K/15	GETTY CANADIAN METALS LTD.	AU BASEMETALS	OMEP	AMAG, AEM, GL, rTr, GEOCHEM	1983 1984	OM83-1 -C-379	
BAIRD TWP.	52K/13	AIKEN-RUSSET RED LAKE MINES LTD.	AU	ASSESS	MAG, VLF-EM	1985	2.8481	83-85
BAIRD TWP.	52K/13	CANHORN MINING CORP.	AU	ASSESS	AMAG, AEM	1986	2.9370	67-86
BALMER TWP. RANGER TWP.	52N/4 52N/4	COMINCO LTD.	AU	ASSESS	MAG, HLEM	1985	2.8652	129-85
BALMER TWP. RANGER TWP.	52N/4 52N/4	COMINCO LTD.	AU	ASSESS	MAG, HLEM, OVD, SA	1985	2.8980	8-86
BALMER TWP.	52N/4	COMINCO LTD.	AU	ASSESS	DDH(1)-180'	1986		41-86
BALMER TWP.	52N/4	GOLDQUEST EXPLORATION INC.	AU	ASSESS	DDH(3)-2011'	1986		46-86
BALMER TWP. BATEMAN TWP.	52N/4 52N/4	REDCON GOLD MINES LTD.	AU	OMEP	DDH(22)-5735', GEOCHEM	1979	MEAP RL-76	
BATEMAN TWP.	52N/4	HERBERT, L.	AU	ASSESS	rTr, Str	1986		80-86
BATEMAN TWP.	52N/4	MCFINLEY RED LAKE MINES LTD.	AU	OMEP	DDH, SA, UG	1984 1985	OM84-1 -P-283	
BATEMAN TWP.	52N/4	MCFINLEY RED LAKE MINES LTD. SABINA INDUSTRIES LTD.	AU	OMEP	DDH, UG	1982	63.4282	OM82-1 -JV-186
BORLAND LAKE WEST OF BORLAND LAKE SOUTH OF VARVECLAY LAKE GORMAN RIVER	53D/16 53D/16 53E/1 53E/1	MASSIVE ENERGY LTD.	AU	ASSESS	AMAG, AEM	1985	2.8526	98-85
BORLAND LAKE	53D/16	MASSIVE ENERGY LTD.	AU	ASSESS	AMAG, AEM	1985	2.8895	1-86
BORLAND LAKE SOUTH OF VARVECLAY LAKE GORMAN RIVER WEST OF BORLAND LAKE	53D/16 53E/1 53E/1 53D/16	MASSIVE ENERGY LTD.	AU	ASSESS	GL	1985	2.9310	50-86
BORLAND LAKE	53D/16	MASTER RESOURCES AND DEVELOPMENTS LTD.	AU	ASSESS	AMAG, AEM	1985	2.8894	3-86
BORLAND LAKE NORTH OF FAVOURABLE	53D/16 53C/13	MASTER RESOURCES AND DEVELOPMENTS LTD.	AU	ASSESS	GL	1985	2.9414	56-86
BORLAND LAKE	53D/16	SANDS MINERALS CORP.	AU	ASSESS	AMAG, AEM	1985	2.8893	2-86
BUCKETT LAKE	53C/10	BP RESOURCES CANADA LTD.	AU	ASSESS	MAG	1986	2.9031	7-86
BUCKETT LAKE HEWITT LAKE	53C/10 53C/7	BP RESOURCES CANADA LTD.	AU	ASSESS	GEOCHEM	1985	2.9231	34-86
BUCKETT LAKE	53C/10	ROCKSPAN RESOURCES LTD.	AU	ASSESS	DDH(2)-164.6', SA	1985	2.8916	157-85
BUCKETT LAKE	53C/10	ROCKSPAN RESOURCES LTD.	AU	ASSESS	DDH(3)-1150'	1986		42-86
CASUMMIT LAKE SATTERLY LAKE KEIGAT LAKE SEAGRAVE LAKE	52N/8 52N/8 52N/8 52N/8	BP RESOURCES CANADA LTD.	AU	ASSESS	MAG, VLF-EM, IP	1985	2.9066	31-86
CASUMMIT LAKE KEIGAT LAKE SEAGRAVE LAKE SATTERLY LAKE	52N/8 52N/8 52N/8 52N/8	BP RESOURCES CANADA LTD.	AU	ASSESS	GL	1985	2.9065	36-86

TABLE 2.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
CASUMMIT LAKE	52N/8	CARMAC RESOURCES LTD. TENAJON SILVER CORP.	AU	OMEP	DDH(2)-1304'	1983 1984	63.4341	OM83-1 -JV-90
CASUMMIT LAKE	52N/8	CARMAC RESOURCES LTD.	AU	OMEP	DDH(6)-2380.3'	1984	OM83-1 -C-386	
CASUMMIT LAKE	52N/8	CARMAC RESOURCES LTD.	AU	OMEP	DDH(10)-4166'	1984	OM84-1 -C-171	
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-489'	1986		14-86
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(13)-6038'	1985		25-86
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-331'	1986		92-86
CASUMMIT LAKE KEIGAT LAKE SATTERLY LAKE SEAGRAVE LAKE	52N/8 52N/8 52N/8 52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	AMAG, AEM	1985	2.8687	146-85
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	GL, Str	1985	2.9498	68-86
CASUMMIT LAKE	52N/8	HODGSON, R.	AU	ASSESS	L-GEOCHEM	1985	2.8641	142-85
CASUMMIT LAKE	52N/8	KOSTYNUK, A.	AU	ASSESS	MAG	1986	2.9127	21-86
CASUMMIT LAKE	52N/8	MAPLE LEAF PETROLEUM COMPANY LTD.	AU	ASSESS	MAG, VLF-EM, GL, SA	1985	2.8532	141-85
CASUMMIT LAKE	52N/8	ST. JOE CANADA INC.	AU	OMEP	VLF-EM, HLEM, DDH(14)-7735'	1984	63.4414	OM83-1 -C-198
CASUMMIT LAKE SATTERLY LAKE LITTLE SHABUMENI LAKE SHABUMENI LAKE	52N/8 52N/8 52N/7 52N/7	ST. JOE CANADA INC.	AU	ASSESS	AMAG, AEM	1986	2.9268	43-86
CASUMMIT LAKE	52N/8	VEINOTT, C.	AU	ASSESS	DDH(1)-102'	1986		55-86
CORLESS TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-500'	1985		22-86
CORLESS TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(3)-1562'	1985		89-86
DENT TWP.	52N/2	DEVONSHIRE GOLD RESOURCES INC.	AU	OMEP	DDH(11)-2862', SA, IP	1983	63.4306	OM83-1 -C-69
DENT TWP.	52N/2	DEVONSHIRE GOLD RESOURCES INC.	AU	OMEP	DDH(14)-4365', IP	1983 1984	OM84-1 -C-114	
DENT TWP. CORLESS TWP.	52N/2 52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1986	2.9071	23-86
DENT TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	DDH(1[illegible])-2576'	1985		11-86
DENT TWP. EARNGEY TWP.	52N/2 52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	BS	1985 1986	2.9165	37-86
DENT TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	DDH(8)-3902'	1986		79-86
DENT TWP.	52N/2	SHERRITT GORDON MINES LTD.	AU	OMEP	DDH(6)-446'	1983	63.3990	OM83-1 -C-42
DOME TWP.	52N/2	AUPAN RED LAKE RESOURCES LTD.	AU	OMEP	DDH(1)-150'	1983	63.4357	OM83-1 -C-195
DOME TWP.	52N/2	GOLD EAGLE GOLD MINES LTD.	AU	NON ASSESS	GL	1959		
EARNGEY TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	DDH(10)-1899'	1985		10-86
FAIRLIE TWP.	52N/4	CHEVRON MINERALS LTD.	AU	ASSESS	GEOCHEM	1985	2.9333	58-86
FAIRLIE TWP.	52N/4	REDAURUM RED LAKE MINES LTD.	AU	ASSESS	MAG, VLF-EM	1986	2.9293	40-86
FAIRLIE TWP.	52N/4	SHERRITT GORDON MINES LTD.	AU	ASSESS	AMAG, AEM	1986	2.9133	15-86
FAVOURABLE LAKE (NORTH PART)	53C/13	MASTER RESOURCES AND AND DEVELOPMENTS LTD.	AU	ASSESS	MAG, VLF-EM, GL	1985	2.9211	39-86

TABLE 2.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
FREDART LAKE GERRY LAKE	52K/15 52K/14	NORANDA EXPLORATION COMPANY LTD.	AU BASEMETALS	ASSESS	MAG, HLEM, GL, GEOCHEM, SA, BS	1985	2.8675	131-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASEMETALS	ASSESS	MAG, VLF-EM	1985	2.8435	85-85
GERRY LAKE SOUTH OF OTTER LAKE	52K/14 52K/14	BP RESOURCES CANADA LTD.	AU	ASSESS	DDH(3)-1323.6'	1984 1985 1986		52-86
GERRY LAKE FREDART LAKE	52K/14 52K/15	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	MAG, HLEM, GL, GEOCHEM, SA, BS	1985	2.8674	130-85
GERRY LAKE	52K/14	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	MAG, PEM	1986	2.9456	36-86
HAMMELL LAKE	52M/1	GIBSON, R.	AU	ASSESS	DDH(6)-623.5'	1986		64-86
HAMMELL LAKE	52M/1	GIBSON, R.	AU	ASSESS	DDH(3)-320'	1986		69-86
HAMMELL LAKE	52M/1	GOLDQUEST EXPLORATION INC.	AU	OMEP	rTr, Str	1984	63.4433	OM84-1 -P-161
HAMMELL LAKE	52M/1	KEELEY FRONTIER RESOURCES LTD.	AU	OMEP	DDH(46)-7728.5', GL	1983	OM83-1 -C-245	
HAMMELL LAKE	52M/1	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	DDH(1)-297'	1986		93-86
HAMMELL LAKE	52M/1	PIPESTONE BAY RESOURCES LTD.	AU	OMEP	MAG, VLF-EM, HLEM, DDH	1983	63.4310	OM83-1 -C-84
HAMMELL LAKE	52M/1	SOLTERMAN, R.	AU	OMEP	DDH(3)-821'	1983	63.4294	OM83-1 -I-21
HEYSON TWP. DOME TWP.	52K/13 52N/4	PETERSON, C. W.	AU	OMEP	Str, SA	1983	63.4290	OM83-1 -1-3
HONEYWELL TWP.	52N/12	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(8)-2927'	1985		75-86
HONEYWELL TWP.	52N/12	KIDD CREEK MINES LTD.	AU	ASSESS	MAG, VLF-EM	1986	2.9092	24-86
KIPPEN LAKE	53G/5	CANADIAN OCCIDENTAL PETROLEUM LTD.	AU	OMEP	GL, GEOCHEM	1983	63.4298	OM83-1 -C-40
KIPPEN LAKE	53G/5	CANADIAN OCCIDENTAL PETROLEUM LTD.	AU	OMEP	DDH(3)-1399', GL, GEOCHEM	1984	2.6265	OM83-1 -C-284
LINGMAN LAKE NORTH OF LINGMAN LAKE SEEBER LAKE VANDERBRINK LAKE	53F/15 53F/15 53F/14 53F/14	KENNCO EXPLORATION (CANADA) LTD.	AU	OMEP	MAG, VLF-EM, GL, GEOCHEM	1984	63.4455	OM84-1 -C-186
LINGMAN LAKE	53F/15	NEARCTIC RESOURCES INC.	AU	OMEP	VLF-EM, HLEM, DDH(14)-2674'	1983	2.6519	OM83-1 -C-175
MCDONOUGH TWP.	52N/4	BLUESTACK RESOURCES LTD.	AU BASEMETALS	OMEP	Str, rTr	1983	63.4337	OM83-1 -C-151
MCDONOUGH TWP.	52N/4	BLUESTACK RESOURCES LTD.	AU BASEMETALS	OMEP	DDH(6)-2578'	1984	63.4471	OM83-1 -C-369
MCNAUGHTON TWP.	52N/7	HODGSON, R.	AU	ASSESS	GL	1985	2.8638	109-85
MEEN LAKE	52O/6	ST. JOE CANADA INC.	AU	ASSESS	AMAG, AEM	1986	2.9297	57-86
MITCHELL TWP.	52N/2	BERTRAM, A.	AU	ASSESS	GL, rTr, Str	1985 1986		83-86
MITCHELL TWP.	52N/2	BERTRAM, A.	AU	ASSESS	GL, rTr, Str	1985 1986		84-86
NANGO LAKE	53B/6	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1983	2.9281	53-86
NORTH OF LINGMAN LAKE LINGMAN LAKE VANDERBRINK LAKE	53F/15 53F/15 53F/14	KENNCO EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, VLF-EM, GL, GEOCHEM	1985	2.8819	158-85
NORTH OF TROUT LAKE SETTING NET LAKE	53C/13 53C/13	GETTY CANADIAN METALS LTD.	AU AG	OMEP	VLF-EM, DDH, UG, GL, SA, IP	1982	63.4258	OM82-1 -C-34
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	OMEP	VLF-EM, GL, GEOCHEM	1984	2.8628	OM83-1 -P-372
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	MAG, VLF-EM	1984	2.8628	136-85
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	DDH(3)-1217'	1986		27-86
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	DDH(14)-5127'	1986		48-86

TABLE 2.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	DDH(1)-144'	1986		51-86
SATTERLY LAKE	52N/8	COMINCO LTD.	AU	ASSESS	OVD, SA	1985	2.9336	39-86
SATTERLY LAKE	52N/8	EXPLORCO PROPERTIES INC.	AU	ASSESS	AMAG, AEM	1985	2.9046	28-86
SATTERLY LAKE	52N/8	EXPLORCO PROPERTIES INC.	AU	ASSESS	DDH(10)-3960.5'	1985		33-86
SATTERLY LAKE	52N/8	FASKEN, B. J.	AU	ASSESS	AMAG, AEM	1985	2.8802	169-85
SATTERLY LAKE SHABUMENI LAKE	52N/8 52N/7	KIDD CREEK MINES LTD.	AU	ASSESS	AMAG	1984	2.8728	147-85
SATTERLY LAKE HONEYWELL TWP.	52N/8 52N/12	KIDD CREEK MINES LTD.	AU	ASSESS	MAG, VLF-EM, HLEM	1985	2.8867	170-85
SATTERLY LAKE	52N/8	KIDD CREEK MINES LTD.	AU	ASSESS	DDH(8)-1672.6'	1986		44-86
SATTERLY LAKE	52N/8	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	AMAG, AEM	1984	2.8809	148-85
SATTERLY LAKE CASUMMIT LAKE	52N/8 52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(12)-5076.7'	1985		12-86
SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(1)-410'	1985		65-86
SEAGRAVE LAKE CASUMMIT LAKE KEIGAT LAKE	52N/8 52N/8 52N/8	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	MAG, VLF-EM	1985	2.8502	93-85
SHABUMENI LAKE LITTLE SHABUMENI LAKE	52N/7 52N/7	EXPLORCO PROPERTIES INC.	AU	ASSESS	AMAG, AEM	1985	2.9045	29-86
SHABUMENI LAKE	52N/7	EXPLORCO PROPERTIES INC.	AU	ASSESS	AMAG, AEM	1985	2.9044	30-86
SKINNER TWP.	52N/2	CRONLEY, B.	AU	ASSESS	rTr, Str	1986		71-86
SOUTH OF OTTER LAKE GERRY LAKE KARAS LAKE	52K/14 52K/14 52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	DDH(3)-1542'	1984 1985		4-86
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	AU BASEMETALS	ASSESS	DDH(1)-452'	1985		26-86
SOUTH OF OTTER LAKE GERRY LAKE	52K/14 52K/14	SELCO INC.	AU BASEMETALS	OMEP	DDH(5)-2831'	1984 1985	OM83-1 -C-380	
STOUGHTON LAKE MCVICAR LAKE	52O/12 52O/11	UTAH MINES LTD.	AU	ASSESS	AMAG, AEM	1985	2.9379	60-86

Good, D.J.

1986a: Birch Lake Area, (Eastern Half), District of Kenora (Patricia Portion); p.25-29 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p.

1986b: Geology of the Birch Lake Area (Eastern half), District of Kenora, Patricia Portion; Ontario Geological Survey, Open File Report 5627, 58p, 10 photos, 3 tables, 4 figures, and 1 map in back pocket.

Good, D.J. Dawson D., and Wu, L.

1986: Precambrian Geology of the Birch Lake Area (Eastern Half), District of Kenora (Patricia Portion); Ontario Geological Survey, Map P 2964, Geological Series-Preliminary Map, scale 115 840. Geology 1985.

Hugon, H., Schwerdtner, W.M.

1984: Structural Signature and Tectonic History of Deformed Gold-Bearing Rocks in Northwestern Ontario, Grant 149; p.164-176 *in*Geoscience Research Grant Program, Summary of Research 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.

TABLE 2.5: MAPS AND REPORTS PERTAINING TO THE RED LAKE RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports
OFR 5544
OFR 5607
OFR 5627

Preliminary Maps - Geological Series
P.2953
P.2964
P.2989

Open File Maps
OFM 35
OFM 47

Coloured Maps
2492
2493
2494
2495

Pryslak, A.P.
1986: Skinner Township, District of Kenora: Ontario Geological Survey, Geological Series-Preliminary map, P 2953, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1972.

Thurston, P.C.
1986: Geology of the Birch Lake Area, Kenora District, Patricia Portion; Ontario Geological Survey, Open File Report 5607, 96p, 3 tables, 8 figures, and 11 photos.

3. Sioux Lookout Resident Geologist Area, Northwestern Region

D.A. Janes[1], J.W. Redden[2], and G.H. Brown[3]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Sioux Lookout

[2]Industrial Minerals Geologist, Ontario Ministry of Northern Development and Mines, Sioux Lookout

[3]Staff Geologist, Ontario Ministry of Northern Development and Mines, Sioux Lookout

INTRODUCTION

The Sioux Lookout office is presently staffed by D.A. Janes, Resident Geologist, and M.O. Roy, Geological Secretary. The position of Resource Geologist is presently filled by G.H. Brown on a six-month contract basis. J.W. Redden is carrying out an Industrial Minerals Study. Roy Spooner is the Mining Recorder for the Patricia Mining Division and D. Cosco is the Chief Clerk.

During 1986, a number of contract staff were employed in a variety of tasks. A. Stechishen was employed as a Resource Geologist to assist J.W. Redden with the Industrial Minerals Study. C. Proctor is employed as a Geological Technician on the Geological Data Inventory Folio Program for the Patricia Mining Division. C. MacKinnon was employed as a student under the Experience Program and carried out programming assignments for the Geological Data Inventory Folio Program. B. Bowen and two assistants again conducted a core retrieval program during the winter months, centred in the Pickle Lake area. C. Proctor and A. Gasparetto were employed to produce Geological Data Inventory Folios during the spring months. The latter two programs were jointly funded by Employment and Immigration Canada and the Ontario Ministry of Northern Development and Mines, under the Resources Sector Work Program.

The year 1986 was outstanding for mineral exploration in the Patricia Mining Division. Claim staking increased 300 percent over 1985 with 7715 claims recorded in 11 months. Other indices of activity, such as diamond drilling, geological and geophysical surveys, and total assessment work reported, set 15 year highs and recorded increases of 120 to 150 percent. For the first time since the Sturgeon Lake rush of 1970-72, the number of active claims has exceeded 14 000. The total value of reported exploration carried out in the division will exceed $15 000 000.

Mineral exploration activity in the Patricia Mining Division continues a five-year trend in being 90 percent oriented toward gold. The majority of activity is centred on the Uchi Belt in the Patricia and Red Lake Mining Divisions. Activity in the Patricia Mining Division is centred in the Pickle Lake area and to the west in the Muskegsagagen Lake area. Activity in the North Caribou Volcanic Belt also has been quite busy, but has not been the same concentrated activity as has occurred in the Uchi Belt. One promising development has been a renewed interest in the base-metal potential of the Wabigoon Subprovince, specifically in the Evans Lake area near Savant Lake. Significant property development and exploration has occurred around the south Sturgeon mining centre, which hosts the Mattabi and Lyon Lake Deposits. Recently, activity has picked in the Minnitaki Lake area, where reports of the resumption of work on the Goldlund Mine site have stimulated interest. Exploration has been done for platinum in the Big Trout Lake area. In general, activity has been widely spread over the entire Mining Division, when compared to the concentrated activity during 1985.

Over the past 18 months, aerial geophysical surveys, conducted by the Ontario Ministry of Northern Development and Mines, covering the North Caribou Volcanic Belt and nearly the whole of the Uchi Belt within the Patricia Mining Division, have been released. Major mapping projects, on both of these belts, were concluded in 1986, with the result that high quality databases are now available for both these areas.

The Mattabi and Lyon Lake Mines, on Sturgeon Lake, continued in production through 1986. The Thierry Mine (Umex Incorporated), at Pickle Lake, remained in "care and maintenance" during 1986. The Goldlund Mine, in Echo Township, is undergoing a change of control, and remains shut-down.

The Musselwhite Consortium (Dome Mines Limited operator) continued exploration and development on their Opapimiskan Lake Property in 1986. This program resulted in a new find, the Snoppy Lake Deposit, which is undergoing exploration as this report is written. This is in addition to the original Musselwhite Deposit, which has mineral inventory developed by drilling and underground development.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist's Program was somewhat constrained during 1986 by the absence of a full-time Resource Geologist. G.H. Brown was engaged in July to conduct field studies and property examinations in the Pickle Lake area. Ms. Brown worked with an Ontario Geological Survey mapping party led by G. Stott, and contributed to their program, in addition to her other duties (Stott and Brown 1986, p.15)

All operating and shut-down mines within the Division were visited at least once. Two of the three Ontario Geological Survey mapping parties working within the Mining Division were visited on several occasions. Unfortunately, the party working in the North Caribou Lake area could not be visited, due to time and logistical constraints.

Diamond-drill core retrieval and limited cataloging continued in 1986. A program to retrieve drill core in the Pickle Lake area was completed. The greatly increased drill programs in the last several years make this function time-consuming and costly. In the Pickle Lake area, sparse outcrop renders this function of considerable importance.

Several lectures were given to local secondary schools and Junior Ranger Camps by the Resident Geologist and staff.

Two weeks were spent on field trips and visits to Sturgeon Lake. A considerable amount of time was spent on research, visits, and briefings with company personnel on base metal exploration sites. This is a welcome sign of renewed interest in base-metal exploration.

Technical and logistical support was again provided to two graduate students from the University of North Dakota. They are conducting a gold study on the Wabigoon Volcanic Belt and a study on metamorphism of the English River Gneissic Subprovince.

DEVELOPMENT PROJECTS

Dome Mines Limited continued with advanced exploration on their Dona Lake Property, which is located 11 km southeast of Pickle Lake. In 1985-1986, a development shaft was sunk to 160 m and two drifts were driven on the 100 and 160 m levels. A bulk sampling program was completed during the year and revised reserves to 1.18 million tonnes (grading 0.219 ounce gold per ton) were announced (Northern Miner Magazine, August 1986, p.30). The mineralization is located in the nose of a steeply-plunging fold in iron formation and is associated with sulphide replacement of magnetite within the iron-rich portions of the beds. Dome Mines Limited is expected to announce shortly whether or not they will proceed to mine development. The shaft is presently capped.

St. Joe Canada Incorporated continued with advanced development of their Golden Patricia Property near Muskegsagagen Lake, approximately 128 km west of Pickle Lake. Two declines were driven to sample the ore horizon and a bulk sample was taken. St. Joe has announced a revised ore calculation of 860 000 tonnes grading 0.58 ounce gold per ton (Northern Miner, July 14, 1986). The deposit is located within a sequence of mafic flows which are southwest facing, and somewhat overturned to the north. The ore zone is a sheared quartz vein in a narrow silicified zone at the base of a felsic porphyry dike, sill, or massive flow. The area is intensely deformed and at least three deformational phases can be determined in outcrop. Several zones of iron formation are known to exist in the vicinity of the mineralized zone. At least one of these zones is reported to carry gold values, but no grades have been published. The main ore horizon is continuous for at least 4000 feet (1220 m) and is open to the northwest (Northern Miner, April 14, 1986).

There have been reports that the Goldlund Mine Property will change hands shortly, with Camreco Incorporated assuming control over the property. Campbell Resources Incorporated and the stock-holders of Goldlund Mines Limited will retain an interest in the property. A surface and underground exploration program is tentatively planned to assess ore potential below the first level on both the Goldlund Property and Camreco's adjoining Windfall Deposit (Northern Miner, July 14, 1986). This program is projected to start in February, 1987.

ONTARIO GEOLOGICAL SURVEY FIELD PROGRAMS

The Ontario Geological Survey carried out several major programs within the Patricia Mining Division during 1986. In addition, one major geophysical survey was released and another flown and released during the year.

In 1986, a multidisciplinary study of the North Caribou Lake Belt was completed. The program was conducted by F. Breaks and I. Osmani, Precambrian Geology Section, Ontario Geological Survey. It was supplemented by Quaternary studies, carried out by P.F. Finamore, Engineering and Terrain Geology Section, and mineral deposit studies conducted by D. Piroshco, Mineral Deposits Section. This summer marks the completion of this study which integrated geophysical, geochemical, quaternary, and precambrian mapping disciplines, and resulted in a very high-quality database for this belt, last mapped by Jack Satterly in 1939. It is a tribute to Dr. Satterly that his basic map has not been changed to any great extent; rather, more detail has been added and the underlying structure of the belt is somewhat better demonstrated. In many ways, this project has demonstrated the most efficient way to study an isolated northern volcanic belt.

G.M. Stott completed regional mapping of the Uchi Belt within the Patricia Mining Division and will produce a compilation of the Pickle Lake area geology. Dr. Stott has worked on this project for four of the last five years. To complement the geological studies a geophysical survey was carried out in 1985 and 1986 and the results were released in October 1986. One or two areas remain to be mapped in somewhat greater detail but the framework of the belt has been defined and a good exploration database established. The geophysical release for the Central Uchi Belt is the largest single release of geophysical information, to date, within Ontario.

The third program in the Patricia Mining Division undertaken by the Ontario Geological Survey in 1986 was based south of Sioux Lookout and covered MacFie, McAree, and Avery Townships. The study was conducted by Ben Berger, Precambrian Geology Section, Ontario Geological Survey; at the same time mineral deposit studies were carried out by L.B. Chorlton, Mineral Deposits Section, in Echo Township and the surrounding study area. This program is part of a larger project to improve the geological database for the Wabigoon Volcanics.

MINING ACTIVITY

Mattabi Mines Limited and Noranda Mines Limited, Lyon Lake Division, are located on Sturgeon Lake in the Patricia Mining Division. Mattabi Mines Limited is owned by Noranda Mines Limited (60 percent) and Abitibi-Price Incorporated (40 percent). Ore from both operations is milled at the Mattabi mill to produce zinc, copper, and lead concentrates. Approximately 350 workers are employed at both mines and the planned milling rate is 1 000 000 tons per year. The Mattabi Mine is projected to close in the second quarter of 1988 due to exhaustion of reserves (The Chronicle Journal, December 5, 1986, p.3). It is planned that the Mattabi mill will be downsized and ore will be supplied from the Lyon Lake Mine. Employment should drop to 170 at that time. The continuation of operations will depend on economic conditions at the time.

Noranda Mines is reported to be planning a $5 000 000 development program to increase reserves at the Lyon Lake Mine (Dryden Observer; Dryden, December 3, p.1). A joint Ontario-Canada project under the Canada-Ontario Mineral Development Agreement (COMDA) is in progress to aid exploration for additional reserves at the Mattabi Mine.

The Thierry Mine (Umex Incorporated) at Pickle Lake is shut down and under care and maintenance by a small staff. This 3000 tons-per-day mine formerly produced copper-nickel concentrate.

The Goldlund Mine in Echo Township is shut down and is flooded. Before shutdown, the mine produced gold concentrate from a 300 400 tons-per-day floatation mill. As mentioned earlier, it is planned to conduct surface and underground exploration with a view to re-opening this past producer.

MINERAL EXPLORATION ACTIVITY

As stated in the introduction, 1986 has been a very good year for exploration in the Patricia Mining Division. Not since the peak years of the Sturgeon Lake rush of 1970-72 have such high levels of activity been seen. Claim staking has reached the highest level to date for the division, with 6000 claims recorded in one ten week period in the Spring of 1986. At year end, claim staking is again increasing due in part to the Pickle Lake area geophysical survey released in October, 1986. One index of activity is that from 20 to 24 diamond drills were in place in the Pickle Lake area by December 1, 1986.

The importance of the Ontario Mineral Exploration Program (OMEP) and the flow-through share provisions of the Federal Income Tax Act is shown by the amount of exploration financed in part by these two programs. OMEP committments have doubled over 1985 within the Division and over half of active exploration is partially funded by this program. The range and size of exploration activity is shown in Figures 3.1a, 3.1b, 3.2a, and 3.2b and in Tables 3.1 and 3.2.

The majority of the work is focused on the Uchi Subprovince, mainly around the Muskegsagagen Lake and Pickle Lake centres. Considerable exploration is continuing in the North Caribou Lake Belt, in particular around Agutua Arm of North Caribou Lake, the Opapimiskan Lake properties of the Musselwhite Consortium and Van Horne Gold Exploration/Moss Resources Limited, and the eastern end of the Belt near Forester and Neawagank Lakes where recent discoveries of gold by Tex-U.S. Oil and Gas Incorporated has drawn attention to this extremely interesting area.

The most significant discovery made recently in the North Caribou Belt has been the Snoppy Lake Prospect located 2 km east of the Musselwhite Property on Opapimiskan Lake. Dome Mines Limited, operator for the Musselwhite Consortium, announced that the new discovery had significant gold values over 4 to 5 m width for a length down plunge of 1000 m (Northern Miner, August 11, 1986). Other reports have quoted an average grade of 0.26 ounce gold per ton over 4.5 m (Breaks, Osmani, and DeKemp 1986). This new find is very significant in that it suggests that the large Opapimiskan Lake structure may host other similar deposits with significant tonnage potential. Recent mapping in the Forester-Neawagank Lakes area suggests that a similar structure may exist there (Breaks, Osmani, and DeKemp 1986).

The extensive drilling and surface exploration program being conducted by Highland-Crow Resources Limited on the past producing Pickle Crow Mine has suggested that this mine may produce again. Known significant tonnages exist in the crown pillar of this mine and work done recently has suggested that sulphide-replaced iron formation may provide additional gold ore.

There was intensivve exploration activity in the central Uchi Subprovince from Birch Lake to Fort Hope. Little open ground remains near Pickle Lake and more than 15 groups are running exploration programs. Should any of the two or three most advanced properties be brought to production, which now appears likely, exploration will expand very rapidly. Claim staking is moving into the Thunder Bay District along the Webb Lake greenstone belt and is expanding to the west into the Red Lake District.

Sturgeon Lake has been relatively quiet in 1986. Falconbridge Limited continued work on the King Bay Properties optioned from Steep Rock Resources Incorporated. A number of groups have suggested that small scale mining be undertaken on some of the higher grade gold properties in the area; attempts to bring this about are under way.

Cumberland Resources Limited have conducted a base-metal exploration program in the Evans Lake area south of Savant Lake. This is close to the Sabine zinc-silver-copper property found by Umex Incorporated near Hough Lake. Cumberland Resources have cut narrow sulphide drill intersections in altered metavolcanic rocks and are continuing their program.

An interesting new program is underway in the Minnitaki Lake area near Sioux Lookout. Moneta Porcupine Mines Incorporated has acquired the Moneta Porcupine Property near the southeastern shore of Vermillion Lake. This gold property is located in the Northern Volcanics near the contact with the overlying Patara Sediments. The property covers a 800 to 900 m long conductor which has a surface exposure of a sulphide-rich chloritic, mafic tuff intruded by grey quartz veins. The sulphide minerals are pyrite and chalcopyrite and have yielded grab samples of up to 0.95 ounce gold per ton. Surface sampling has given a grade of 0.11 ounce gold per ton over 13 feet (4 m) and this has been confirmed by recent drilling. Moneta Porcupine will extend their drilling up to 10 000 feet (3050 m) and has acquired a 170 claim block along the conductor.

Figure 3.1a
SIOUX LOOKOUT RESIDENT GEOLOGIST AREA

EXPLANATION

● Producing Mines
  1. Mattabi Mines Limited. . . . Zn, Cu, Pb, Ag
  2. Noranda Mines Limited . . . Zn, Cu, Pb, Ag

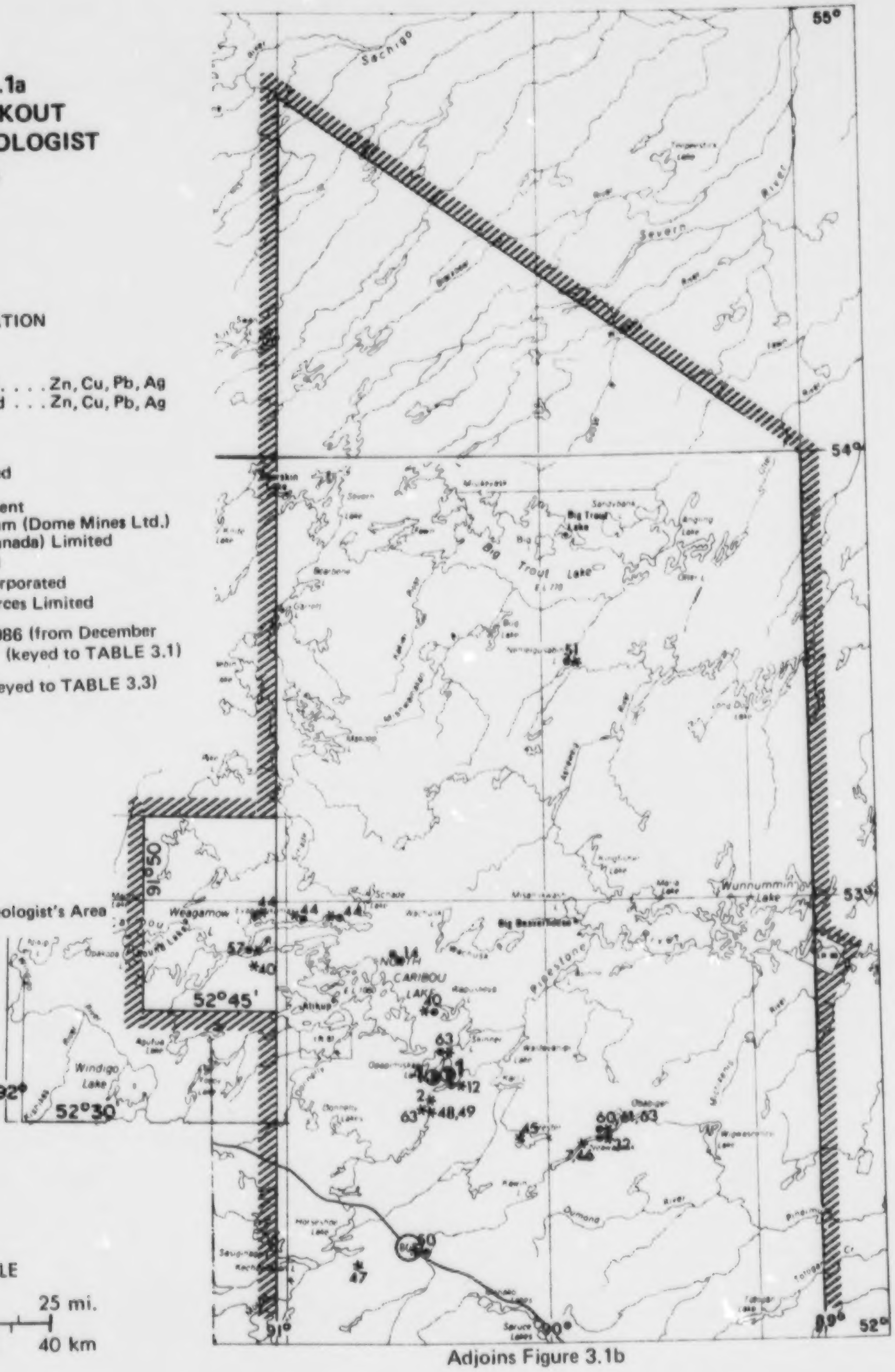
○ Mills
  1. UMEX Incorporated
  2. Goldlund Mines Limited

◑ Property Under Development
  1. Musselwhite Consortium (Dome Mines Ltd.)
  2. Dome Exploration (Canada) Limited
  3. Camreco Incorporated
  4. St. Joe (Canada) Incorporated
  5. Highland-Crow Resources Limited

▪ Exploration Activity in 1986 (from December 1985 to November 1986) (keyed to TABLE 3.1)

* Assessment Work Filed (keyed to TABLE 3.3)

▨ Boundary of Resident Geologist's Area


55°
Sachigo
Severn
River
54°
Big Trout Lake
Big Trout Lake
Wunnummin Lake
53°
91°50'
Weagamow
NORTH CARIBOU LAKE
Pipestone
52°45'
Windigo Lake
92°
52°30'
Ozhiski
91°
90°
89°
52°
51
44
57
40
14
10
63
12
2
48,49
45
60,61,63
32
50
47

SCALE

0 25 mi.

0 20 40 km

Adjoins Figure 3.1b

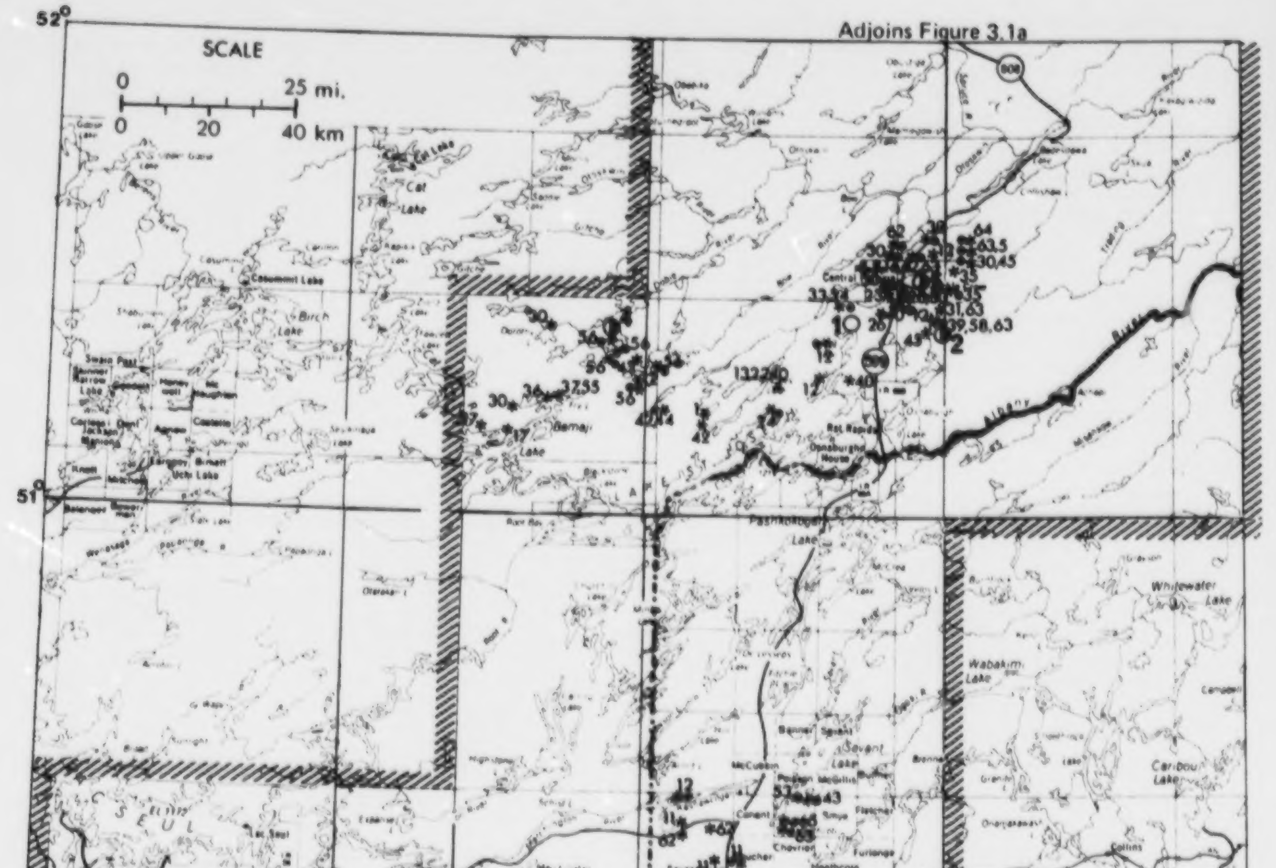
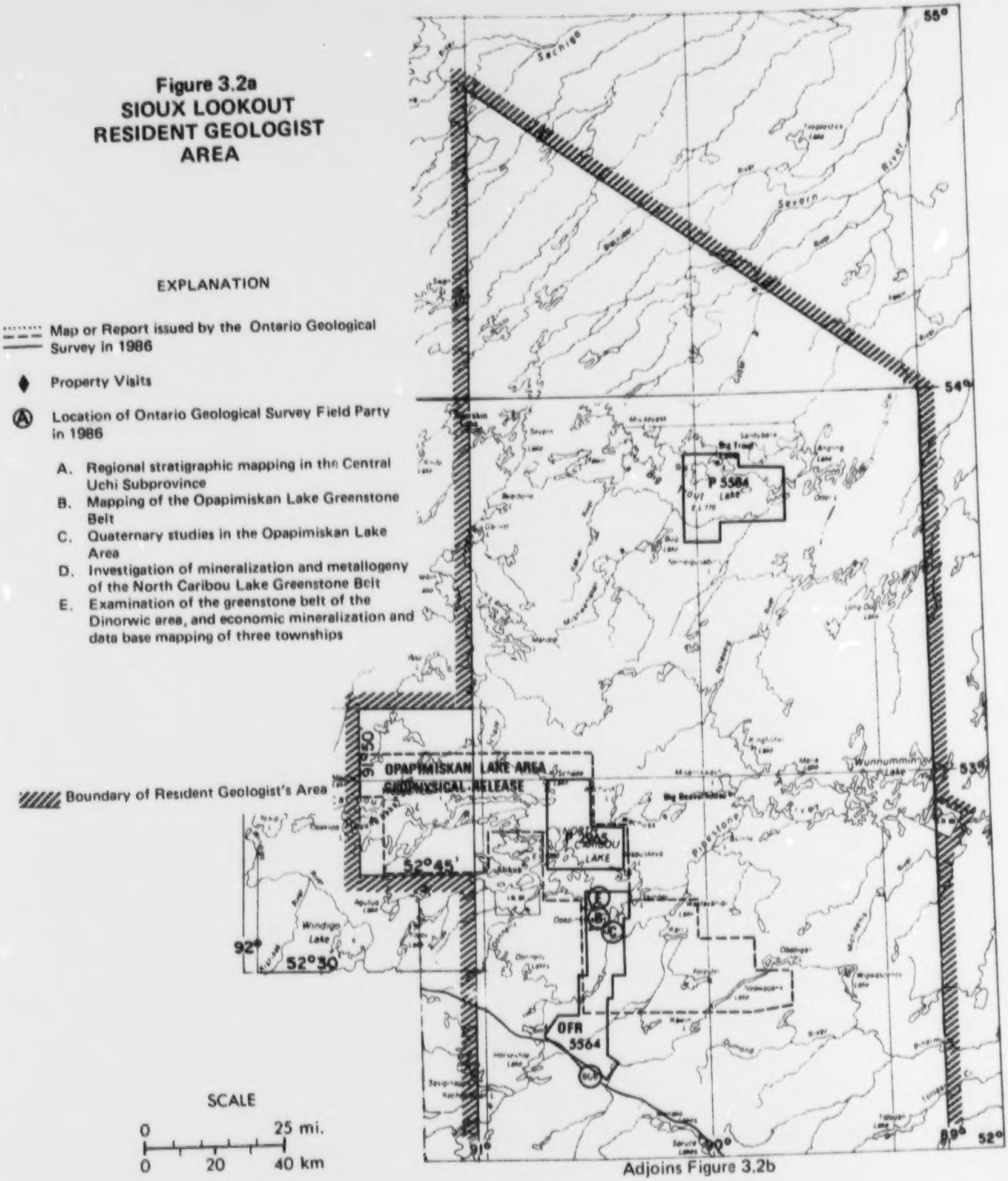

52°
51°
50°
49°
93°
92°
91°
90°
89°
Adjoins Figure 3.1a
SCALE
0
25 mi.
0
20
40 km
Cat Lake
Birch Lake
Central Patricia
Pickle Lake
Osnaburgh House
Albany River
Pashkokogan Lake
Whitewater Lake
Wabakimi Lake
Savant Lake
Caribou Lake
Sturgeon Lake
Obonga Lake
SIOUX LOOKOUT
Minnitaki
Van Horne
Dinorwic
Wabigoon
Block No. 6
Block No. 5
KENORA
17
72
599
808
800
Ignace
White Otter L.
Savanne

Figure 3.1b
SIOUX LOOKOUT
RESIDENT GEOLOGIST
AREA

For Explanation see Figure 3.1a, page 49

Figure 3.2a
SIOUX LOOKOUT RESIDENT GEOLOGIST AREA



EXPLANATION

Map or Report issued by the Ontario Geological Survey in 1986

Property Visits

Ⓐ Location of Ontario Geological Survey Field Party in 1986

- A. Regional stratigraphic mapping in the Central Uchi Subprovince
- B. Mapping of the Opapimiskan Lake Greenstone Belt
- C. Quaternary studies in the Opapimiskan Lake Area
- D. Investigation of mineralization and metallogeny of the North Caribou Lake Greenstone Belt
- E. Examination of the greenstone belt of the Dinorwic area, and economic mineralization and data base mapping of three townships

Boundary of Resident Geologist's Area

SCALE
0 25 mi.
0 20 40 km
55°
54°
53°
52°
92°
91°
90°
89°
52°30'
52°45'
91°30'
OPAPIMISKAN LAKE AREA GEOPHYSICAL RELEASE
NORTH CARIBOU LAKE
P 5564
OFR 5564
Wunnummin Lake
Severn
Sachigo
Pipestone
Windigo Lake

Adjoins Figure 3.2b

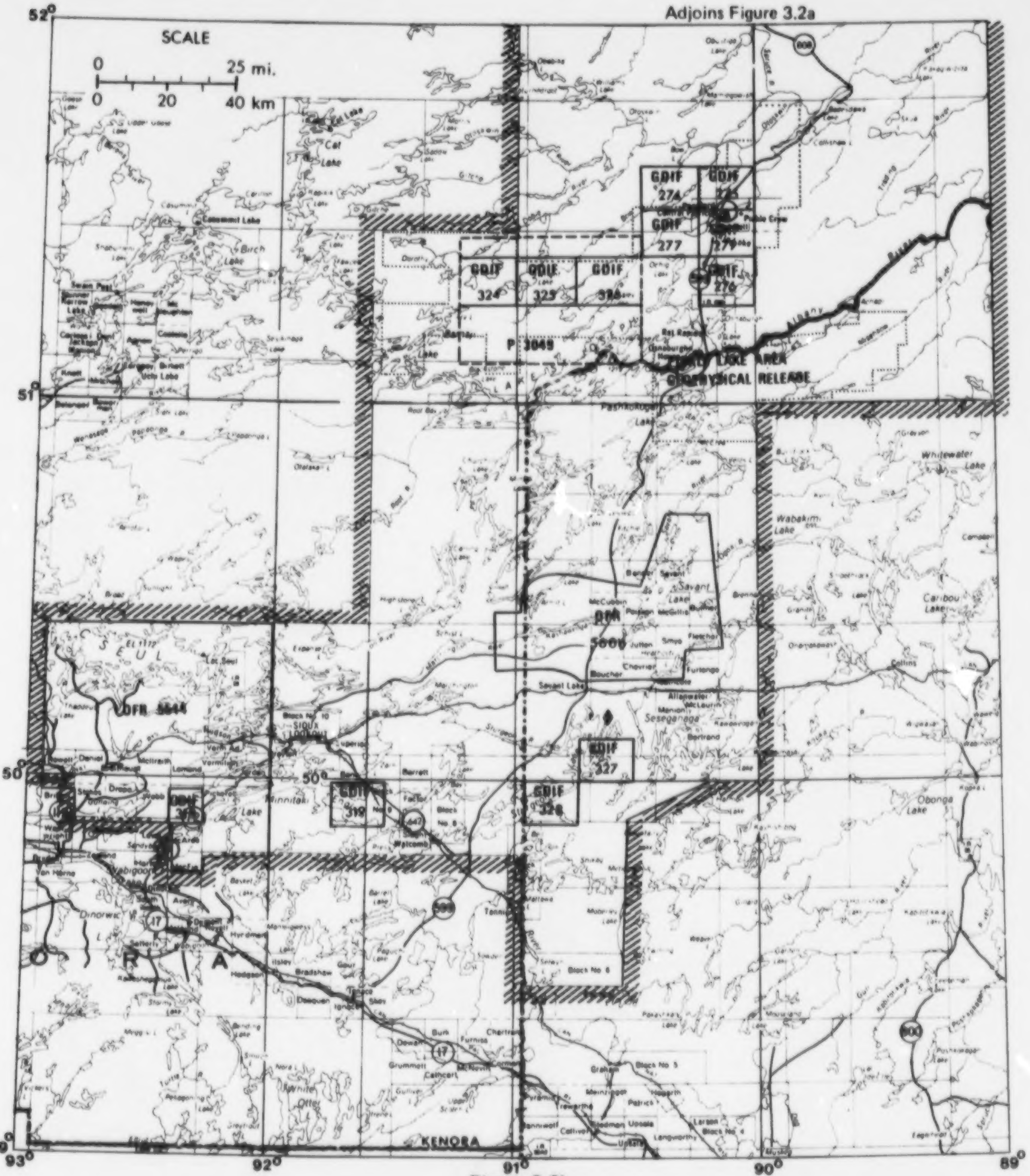

Adjoins Figure 3.2a
SCALE
0
25 mi.
0
20
40 km
52°
51°
50°
49°
93°
92°
91°
90°
89°
Cat Lake
Birch Lake
GDIF 274
GDIF 277
GDIF 324
GDIF 325
GDIF 326
GDIF 276
P 3049
PICKLE LAKE AREA GEOPHYSICAL RELEASE
Savant Lake
ODM 5000
OFR 5844
SIOUX LOOKOUT
GDIF 319
GDIF 328
GDIF 327
Sesaganaga
Whitewater Lake
Wabakimi Lake
Caribou Lake
Obonga Lake
Dinorwic
Block No 6
Block No 5
KENORA

Figure 3.2b
SIOUX LOOKOUT
RESIDENT GEOLOGIST
AREA

For Explanation see Figure 3.2a, page 51

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 3.1

Number on Figure	Individual or Company	Activity
1	AMOCO CANADA LIMITED	OVERBURDEN DRILLING AND ASSAYING DONE IN THE DUFFELL LAKE AREA
2	ARMSTRONG, G. BEST, A. RIED, B. JOHNSON, S. LABELLE, R. J.	OVERBURDEN DRILLING, ASSAYING, MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN THE ZEEMEL LAKE AREA
3	BAY EXPLORATION LIMITED	ASSAYING IN FOURBAY LAKE AREA
4	BENDERITE, A.	STRIPPING IN THE SQUAW LAKE AREA
5	BILLINGTON CANADA LIMITED HODGE, H. J. ROBERT, G. ROBERT, J. MORIN, J.	MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN THE FIRSTLOON LAKE AREA: MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS, TRENCHING AND SAMPLING IN THE TARP LAKE AREA
6	BP RESOURCES CANADA LIMITED	DIAMOND DRILLING IN THE MCILRAITH TOWNSHIP
7	CANADIAN NICKEL COMPANY LIMITED	DIAMOND DRILLING, ASSAYING AND OVERBURDEN DRILLING IN THE NEAWAGANK LAKE AREA: OVERBURDEN DRILLING IN THE WHIPPER LAKE AREA
8	CINDY MAE RESOURCES INCORPORATED HODGE, H. J.	DIAMOND DRILLING, ASSAYING IN THE TARP LAKE AREA
9	CLINE DEVELOPMENT CORPORATION	AIRBORNE MAGNETIC AND AIRBORNE ELECTROMAGNETIC SURVEYS IN THE VALORA LAKE AREA
10	COASTORO RESOURCES LIMITED	MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE BECKINGTON LAKE AREA
11	CUMBERLAND RESOURCES LIMITED CUNNINGHAM, L. J. REDFERN RESOURCES LIMITED VESTOR EXPLORATION LIMITED	GEOLOGICAL, MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE EVANS LAKE AREA AS WELL AS DIAMOND DRILLING: AIRBORNE MAGNETIC AND AIRBORNE ELECTROMAGNETIC SURVEYS, GEOLOGICAL AND RESISTIVITY SURVEYS IN THE HOUGHTON LAKE AREA: DIAMOND DRILLING IN THE SIXMILE LAKE AREA
12	DOME EXPLORATION CANADA LIMITED	DIAMOND DRILLING IN THE ZEEMEL LAKE AREA: MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE TARP LAKE AREA: DIAMOND DRILLING IN THE LITTLE OCHIG LAKE AREA: MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE KAWASHE LAKE AREA: MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE KAPKICHI LAKE AREA: DIAMOND DRILLING AND ASSAYING IN THE DONA LAKE AREA: MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE ARMIT LAKE AREA
13	EDEN ROC MINERALS CORPORATION	MAGNETIC AND GEOLOGICAL SURVEYS IN THE CALEY LAKE AREA
14	ELDOR RESOURCES	MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE ERICHSEN LAKE AREA: GEOLOGICAL, GEOCHEMICAL, MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE NORTH CARIBOU LAKE AREA
15	ERIKSON, GLEN MINE LAKE RESOURCES INCORPORATED	DIAMOND DRILLING IN THE BECKINGTON LAKE AREA
16	ESSO MINERALS CANADA LIMITED ESSO RESOURCES CANADA LIMITED	GEOLOGICAL SURVEY, STRIPPING AND SAMPLING IN THE TARP LAKE AREA
17	FTM RESOURCES LIMITED	GEOLOGICAL SURVEY AND ASSAYING IN THE FRY LAKE AREA
18	FALCONBRIDGE LIMITED AND STEEPROCK RESOURCES INCORPORATED	DIAMOND DRILLING IN THE FOURBAY LAKE AREA
19	FIRST GENERATION RESOURCES LIMITED (W. J. G. GRIFFIS)	ELECTROMAGNETIC SURVEY IN FOURBAY LAKE AREA
20	FIRTH, GOETLER AND ASSOCIATES LIMITED	ELECTROMAGNETIC SURVEY IN THE DONA LAKE AREA
21	GIANT STURGEON MINING CORPORATION L.	MAGNETIC SURVEY IN THE FOURBAY LAKE AREA
22	GOLDEN MAVERICK RESOURCES	AIRBORNE MAGNETIC AND AIRBORNE ELECTROMAGNETIC SURVEYS IN THE CALEY LAKE AREA
23	GOLDEN SHADOW RESOURCES	MAGNETIC, ELECTROMAGNETIC, INDUCED POLARIZATION, GEOLOGICAL AND GEOCHEMICAL SURVEYS, TRENCHING AND OVERBURDEN DRILLING IN THE DONA LAKE AREA
24	GOLDEN TERRACE	DIAMOND DRILLING IN THE NATAPESATAKUN BAY AREA
25	GOLDWIN RESOURCES LIMITED	DIAMOND DRILLING IN THE ZARN LAKE AREA
26	HODGE, H. J. GEOCANEX	MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN THE DONA LAKE AREA
27	HOYLE RESOURCES INCORPORATED REGIS DEVELOPMENT CORPORATION	DIAMOND DRILLING IN THE FOURBAY LAKE AREA
28	HUDSON BAY EXPLORATION AND DEVELOPMENT COMPANY LIMITED STEEPROCK RESOURCES INCORPORATED	DIAMOND DRILLING IN THE FOURBAY LAKE AREA

TABLE 3.1 Continued

Number on Figure	Individual or Company	Activity
29	JALNA RESOURCES LIMITED	AIRBORNE MAGNETIC AND AIRBORNE ELECTROMAGNETIC AND INDUCED POLARISATION IN THE SIXMILE LAKE AREA
30	KERR ADDISON MINES LIMITED	AIRBORNE MAGNETIC/AIRBORNE ELECTROMAGNETIC-FIRSTLOON LK: ELECTROMAG., MAGNETIC, AND GEOLOGICAL SURVEYS, ASSAYING, DIAMOND DRILLING AND OVERBURDEN DRILLING IN THE DONA LAKE AREA: GEOLOGICAL AND GEOCHEMICAL SURVEYS, TRENCHING IN THE FRY LAKE AREA: GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE MEEN LAKE AREA: MAGNETIC, ELECTROMAGNETIC GEOLOGICAL AND GEOCHEMICAL SURVEYS, ASSAYING, OVERBURDEN DRILLING AND DIAMOND DRILLING IN THE TARP LAKE AREA
31	KOVAL, D. KOMAR RESOURCES LIMITED	GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE DONA LAKE AREA
32	LANDEN INVESTMENTS LIMITED	DIAMOND DRILLING IN THE NEAWAGANK LAKE AREA
33	LEE, NORMAN	STRIPPING AND TRENCHING IN THE KAPKICHI LAKE AREA
34	LEGION RESOURCES LIMITED	AIRBORNE MAGNETIC AND AIRBORNE ELECTROMAGNETIC SURVEYS IN THE KAPKICHI LAKE AREA
35	MARIETTA RESOURCES LIMITED	TRENCHING, STRIPPING AND MECHANICAL WORK, MAGNETIC AND ELECTROMAGNETIC SURVEYS, GEOLOGICAL SURVEY, DIAMOND DRILLING IN THE DONA LAKE AREA: GEOLOGICAL, GEOCHEMICAL SURVEYS IN THE TARP LAKE AREA
36	MCCANNELL, J. A.	DIAMOND DRILLING IN THE FRY LAKE AREA
37	MCCANNELL, J. D.	MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS, DIAMOND DRILLING IN THE FRY LAKE AREA
38	MISTANGO CONSOLIDATED RESOURCES LIMITED	DIAMOND DRILLING IN THE SQUAW LAKE AREA
39	MORIN, RAY	DIAMOND DRILLING IN THE DONA LAKE AREA
40	MOSS RESOURCES LIMITED HORSESHOE RESOURCES LIMITED	GEOLOGICAL, MAGNETIC AND ELECTROMAGNETIC SURVEYS, TRENCHING AND ASSAYING IN THE AKOW LAKE AREA: MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL, INDUCED POLARISATION, GEOCHEMICAL SURVEYS, TRENCHING, AND DIAMOND DRILLING IN THE CALEY LAKE AREA: MAGNETIC, ELECTROMAGNETIC, INDUCED POLARISATION, GEOLOGICAL AND GEOCHEMICAL SURVEYS AND TRENCHING IN THE DONA LAKE AREA: AIRBORNE MAGNETIC AND AIRBORNE ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN THE LITTLE OCHIG LAKE AREA: MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL IN THE RANDALL LAKE AREA
41	NAHANNI MINES LIMITED	DIAMOND DRILLING IN DRAYTON TOWNSHIP: DIAMOND DRILLING IN WHIPPER LAKE AREA
42	NORANDA EXPLORATION COMPANY LIMITED	MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL, GEOCHEMICAL SURVEYS AND ASSAYING IN THE DUFFELL LAKE AREA: STRIPPING AND SAMPLING IN THE PARNES LAKE AREA: MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL AND GEOCHEMICAL SURVEYS AND DIAMOND DRILLING IN THE KAWASHE LAKE AREA
43	NORONTEX EXPLORATION LIMITED	MAGNETIC AND ELECTROMAGNETIC SURVEYS IN JUTTEN TOWNSHIP
44	NORTHERN DYNASTY EXPLORATION	MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE DUFFELL LAKE AREA: MANUAL WORK IN THE KEEYASK LAKE AREA: MANUAL WORK AND DIAMOND DRILLING IN THE SESEEP LAKE AREA
45	ONTARIO LIMITED (591343) VAN HORNE GOLD EXPLORATION	MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN THE DONA LAKE AREA: GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE FIRSTLOON LAKE AREA: MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN FORESTER LAKE AREA
46	ONTARIO LIMITED (628823) HODGE, J. RECOSKIE, F.	MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS IN THE NEAWAGANK LAKE AREA
47	ONTARIO LIMITED (581356)	MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL SURVEYS IN WAPANISK CREEK AREA
48	ONTARIO LIMITED (493217)	MAGNETIC, ELECTROMAGNETIC IN THE ZEEMEL LAKE AREA
49	OPEX RESOURCES INCORPORATED	PROPERTY REPORT IN THE ZEEMEL LAKE AREA (PROSPECTUS)
50	PETROMET RESOURCES LIMITED	ELECTROMAGNETIC, GEOLOGICAL AND GEOCHEMICAL SURVEYS, DIAMOND DRILLING IN WAPANISK CREEK AREA
51	PLATINUM EXPLORATION CANADA LIMITED	DIAMOND DRILLING IN THE MENEIGUSABING LAKE AREA
52	PROLIFIC PETROLEUM LIMITED	WORK REPORT, ASSAYING, MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE PENASSI LAKE AREA
53	RAMSAY, RAYMOND G.	DIAMOND DRILLING IN POISSON TOWNSHIP
54	REDDEN, J. W.	PROPERTY REPORT IN THE SIXMILE LAKE AREA
55	SHERRITT GORDON MINES LIMITED	GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE FRY LAKE AREA
56	ST. JOE CANADA LIMITED	DIAMOND DRILLING, MAGNETIC, ELECTROMAGNETIC AND GEOLOGICAL SURVEYS, AIRBORNE ELECTROMAGNETIC SURVEY IN KAWASHE LAKE AREA: DIAMOND DRILLING IN THE WRIGHT LAKE AREA
57	SULPETRO MINERALS LIMITED	GEOLOGICAL SURVEY IN THE KEEYASK LAKE AREA: DIAMOND DRILLING, TRENCHING IN THE WESLEYAN LAKE AREA

TABLE 3.1 Continued

Number on Figure	Individual or Company	Activity
58	SUNBURST EXPLORATIONS LIMITED HODGE, H. J.	DIAMOND DRILLING IN THE DONA LAKE AREA
59	TARBUSH LODE MINING LIMITED	DIAMOND DRILLING IN THE KABIK LAKE/PICKEREL TOWNSHIP AREA
60/61	TEX U.S. OIL AND GAS INCORPORATED HODGE, H. J. ONTARIO (493217)	DIAMOND DRILLING, MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL AND INDUCED POLARISATION SURVEYS IN THE NEAWAGANK LAKE AREA
62	UNEX CORPORATION LIMITED	ELECTROMAGNETIC SURVEY, DIAMOND DRILLING AND ASSAYING IN THE BECKINGTON LAKE AREA: GEOCHEMICAL AND GEOLOGICAL SURVEYS AND SAMPLING IN DONA LAKE AREA: MAGNETIC, GEOLOGICAL, GEOCHEMICAL SURVEYS AND DIAMOND DRILLING IN THE HOUGHTON LAKE AREA: MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE TARP LAKE AREA
63	VAN HORNE GOLD EXPLORATION	GEOLOGICAL, GEOCHEMICAL, MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE DONA LAKE AREA: GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE FIRSTLOON LAKE AREA: DIAMOND DRILLING IN THE NEAWAGANK LAKE AREA: DIAMOND DRILLING IN THE SKINNER LAKE AREA: MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE TARP LAKE AREA: MAGNETIC, ELECTROMAGNETIC, GEOLOGICAL AND GEOCHEMICAL SURVEYS IN THE SEENEL LAKE AREA
64	WALDIE, SCOTT J.	MAGNETIC AND ELECTROMAGNETIC SURVEYS IN THE FIRSTLOON LAKE AREA
65	WESTMIN RESOURCES LIMITED	MAGNETIC, ELECTROMAGNETIC, GEOCHEMICAL SURVEYS IN THE EVANS LAKE AREA: MAGNETIC, ELECTROMAGNETIC SURVEYS IN JUTTEN TOWNSHIP

TABLE 3.2 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

*Corrected figures of 1985 (additional work not shown is included in the Total Man Days)

**1986 figures up to and including November (additional work not shown is included in Total Man Days)

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1974	1,011	3,223	5,659	38,049.0	6,255	102	44,406
1975	1,019	2,489	3,903	38,492.7	18,953	1,858	59,303.7
1976	1,185	1,130	3,958	27,111.0	11,555	185	38,851
1977	1,261	1,320	3,760	17,880.1	13,931	946	32,757.1
1978	2,018	765	5,084	33,371.3	57,501	600	91,472.3
1979	1,012	1,061	5,045	30,869	27,605.4	1,949	60,423.4
1980	3,485	1,391	7,068	42,633	13,524	10,800	66,957
1981	2,861	1,582	8,303	42,588	232,184	4,866	287,626
1982	842	1,766	7,737	35,329	73,486	13,980	167,289
1983	4,398	1,164	10,971	69,568.8	85,536.5	23,738	197,223.1
1984	5,009	4,074	10,625	42,425	113,830	24,941.1	205,214.64
1985*	2,513	3,972	9,166	92,051	148,108	20,376	294,891
1986**	7,715	2,799	14,082	108,812	236,807	28,825	422,691

GEOLOGICAL DATA INVENTORY FOLIO PROGRAM

To date, in 1986, 12 Geological Data Inventory Folios (GDIF's) have been published for the Patricia Mining Division; five additional folios are in press. The GDIF's are concentrated in three areas: the Central Uchi Belt, the Pickle Lake area, and south Sturgeon Lake. A list of the GDIF's completed in 1986 is included at the end of this report.

A project was initiated to prepare GDIF's by utilizing a computer-hosted database program. The aim is to allow the GDIF's to be maintained on an electronic medium and up-dated on demand. The basic program was produced by J. Donald of the Sault Ste. Marie Resident Geologist's Office and will be used for this project. A number of folios and maps produced during 1986 will also be used in a pilot project, designed to produce a graphic database for the Central Uchi Belt. This project forms part of the OGS GEOSIS database trial. Emphasis for the remainder of 1986 and 1987 will be concentrated on completing the coverage of the Uchi Belt and Sturgeon Lake. It is hoped to complete all future GDIF's by utilizing electonic data processing methods.

INDUSTRIAL MINERALS PROJECT, by J.W. Redden

An industrial minerals project was begun in late June 1986, under the Canada-Ontario Mineral Development Agreement (COMDA). The first objective was to select promising deposits of industrial minerals for detailed work. This review resulted in the selection of known deposits of nepheline syenite, marl, soapstone, graphite, leuco-granites and pegmatites for field evaluation. The second objective was to locate potential building stone deposits in the Sioux Lookout-Savant Lake-Ignace-Vermilion Bay area. Locations visited by the author are shown in Figure 3.3.

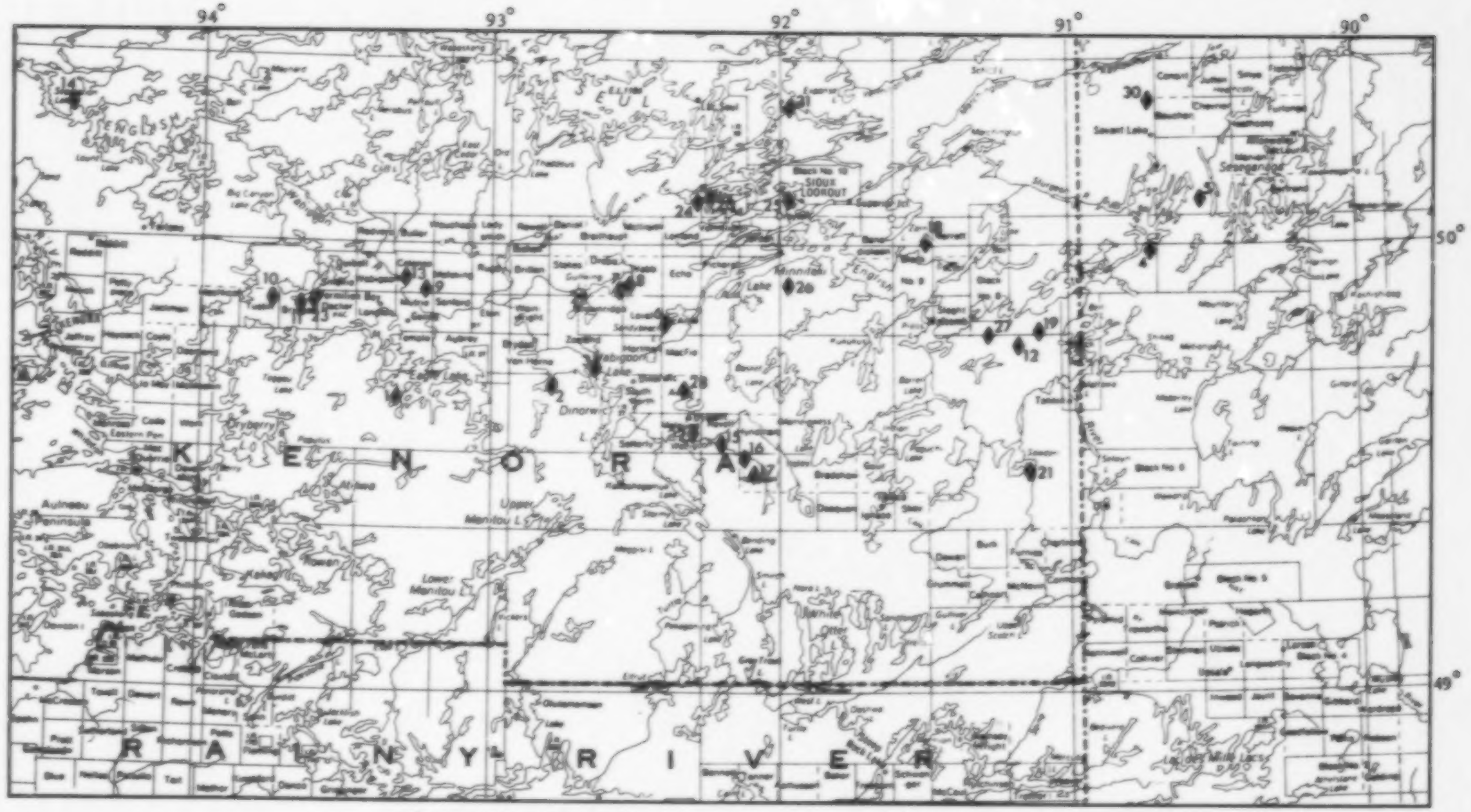


Figure 3.3 Industrial Minerals Project Locations Visited

Soapstone
1. Eagle Lake (Grace Mine)
2. Mile Lake
3. Wabigoon Lake (Wabigoon Resources)

Nepheline Syenite
4. Sturgeon Lake
5. Squaw Lake

Leucogranites and Leucopegmatites
6. Highway 72
7. Gullwing Lake - Drope Township
8. Gullwing Lake - Webb Township
9. Colenso Township
10. Medicine Lake

Pink Pegmatite
11. Harrison Claim

Marl
12. Surprise Lake

Concretions (carbonate)
2. Mile Lake
3. Wabigoon Lake

Clay
2. Mile Lake
13. Colenso Township

Graphite
14. Harrison Showings

Building Stone
15. Revell Batholith - Basket Lake Road
16. Revell Batholith - Highway 17
17. Revell Batholith - Bending Lake Road
18. Lake of Bays Batholith
19. Valora - Jigger Lakes Stock
20. Lost Lake Stock
21. Sowden Lake

Decorative Stone
22. Borups Corner
23. Cobble Lake
24. Rainbow Quarry
25. Sioux Lookout
26. South of Minnitaki Lake
27. Highway 642
28. Avery Township
29. Gullwing Lake
30. Highway 519 - South of Hough Lake
31. Lac Seul

Industrial minerals are used in many every-day products to extend, enhance, or otherwise affect the quality or cost of the final product. Products so enhanced include glass, plastics, ceramics, rubber, and paper. Due to the various applications for industrial minerals, physical and chemical characteristics determine their suitability for a specific use. These characteristics can be very stringent and very specific. Important points to note in the evaluation of industrial mineral deposits are:

1. significant tonnage potential
2. the ability of the deposit to produce a commercially acceptable product
3. proximity to present infrastructure

Many users of industrial minerals are conservative and reluctant to change suppliers. The user must be convinced that a new supplier can reliably deliver a cheaper, or better quality, product for a considerable time. Consequently, marketing and excellent analytical and testing facilities are very important to product acceptance. Successful industrial mineral operations must have substantial reserves to consistently produce products to specifications and be capable of delivering products to the user at competitive prices. A new operation must be aggressive in marketing, and in developing new markets and new applications for their products.

NEPHELINE SYENITE

Nepheline Syenite showings were examined and sampled from the Squaw Lake Alkalic Complex and the Sturgeon Narrows Alkalic Complex. Both are located southeast of Savant Lake, within 4 km of present logging roads. The geology is shown by Trowell *et al.* (1979).

The Squaw Lake Alkalic Complex was sampled at 11 locations, in an area 2.5 by 1.5 km in size, adjacent to shorelines along the northern part of Squaw Lake. Except for the western arm of the lake, where economic possibilities are negated by contact effects and the presence of zenoliths , the northern half of Squaw Lake contains generally coarse-grained leucocratic syenite, with variable nepheline content. The Sturgeon Narrows Alkalic Complex was sampled at 11 locations in a 3 by 1.5 km area south of Coveney Island. The nepheline syenite exposed along the shore in this area consists of a light grey, coarse-grained trachytic phase. Further south is located a leucocratic coarse-grained phase enclosing a leucocratic fine- to medium-grained garnet-bearing phase.

Testing on the samples is underway at the Geoscience Laboratories, Ontario Geological Survey, Toronto. Tests consist of crushing and grinding each sample to -60 mesh and screening at -200 mesh. The +200 mesh and -200 mesh portions are passed separately through a Frantz Isodynamic Separator to remove iron-bearing minerals. The nonmagnetic fractions will be analyzed for iron content, Na_2O, K_2O and Al_2O_3. This procedure is designed to approximate high-intensity magnetic separation used commercially to beneficiate nepheline syenites.

LEUCO-GRANITES AND PEGMATITES

Leuco-granites and pegmatites are potential sources of feldspar, quartz, and mica. Highly differentiated leuco-granites and pegmatites may contain economic amounts of exotic minerals such as beryl (beryllium), tantalite (tantalum), spodumene (lithium), and pollucite (cesium) and may have significant gallium values within the micas.

FELDSPAR

Potassium feldspar is more widely used than sodium feldspar. Commercially, potassium feldspar should contain 10 percent or more K_2O and sodium feldspar a minimum of 7 percent Na_2O. Potassium feldspar is generally used for ceramics. A more or less equal mix of potassium and sodium feldspar is used for glass. Feldspar is usually recovered by a multistage flotation process which removes mica, garnet, and quartz and other iron-bearing minerals. For glass making, a quartz-feldspar mixture may be shipped.

QUARTZ

Quartz (silica) is the primary constituent of glass. It is also used as specialty sand, abrasive, or as raw material for the production of ferrosilicon, silicone compounds, and silicon metal. Ceramic engines are being developed which contain silicon nitride and silicon carbide. In most uses, the chemical and physical requirements are stringent. High chemical purity is a prerequisite to marketing the product.

MICA

Mica, mainly muscovite (white) and phlogopite (amber) is widely used as a filler and extender in paint and plastics and to enhance the properties of drywall cements and oilwell drilling mud. All these applications use ground mica. The use of mica in large sheets is declining as sheet mica insulators have been largely replaced by other materials. Built-up mica and mica paper are manufactured by bonding of smaller mica flakes to produce a less expensive substitute for large sheets.

Several areas were sampled for feldspar and quartz potential. Mica would be a possible by-product from any of the areas examined, as would any of the exotic minerals if associated with the deposits. All the areas examined contain leuco-granite and pegmatite in significant quantities. Other features common to all include their proximity to present roads and their location on topographic highs. Testing on the samples from the various localities is underway at the Geoscience Laboratories, Ontario Geological Survey, Toronto.

MARL

Marl is a form of precipitated calcium carbonate. The generally accepted view is that calcium is carried in solution in ground water as the bicarbonate ion. A change in chemical solubility results in precipitation of the less soluble carbonate. In Northwestern Ontario, marl is associated with calcareous till deposits. Marl deposits were initially deposited on lake bottoms. Subsequent changes in lake levels may result

TABLE 3.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

ABBREVIATIONS FOR TABLES USED IN THIS REPORT

AEM - Airborne Electromagnetic Survey
A Mag - Airborne Magnetometer Survey
Assess - Assessment Work
DD - Diamond Drilling
EM - Electromagnetic Survey
Geochem - Geochemical Survey
GL - Geological Survey
IP - Induced Polarization Survey
Mag - Magnetometer Survey

OMEP - Ontario Mineral Exploration Program
OVD - Overburden Drilling
Pros - Prospectus
Res - Resistivity Survey
SA - Sampling, Assays
STr - Stripping
Tr - Trenching

Mineral and Metal Symbols

Au-Gold
Ag-Silver
Cu-Copper
Pb-Lead
Zn-Zinc
cp-Chalcopyrite
mo-molybdenite
po-pyrrhotite
Mo-Molybdenum

Cs -Cesium
Li -Lithium
Ta -Tantalum
U -Uranium
W -Tungsten
gf -Graphite
gn -Galena
hem -Hematite
mag -Magnetite

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
AROW LAKE	52B/16SW	MOSS RESOURCES L.	py,po	Assess.	GL, Tr, SA	1986	2.8898	-0011
	52B/16SW	MOSS RESOURCES L.	Au,py,po, mag	Assess.	Mag, EM	1986	2.8897	-0012
ARMIT LAKE	52J/07NW	DOME EXPLORATION (CANADA) LIMITED	--	Assess.	Mag, EM	1985	2.8494	-0017-A1
	52J/07NW	DOME EXPLORATION (CANADA) LIMITED	py,po,cp, mag,Au	Assess.	DD 8 2973'	1986	--	-0018
BECKINGTON LAKE	52J/02NE	UNEX INC	py,po,cp	Assess.	EM	1983	2.6201	-0082
	52J/02NE	COASTORO RESOURCES L. (John Pollock)	py	Assess.	Mag, EM	1986	2.7100	-0085
	52J/02NE	UNEX INC	py,po	Assess.	DD 6 3595'	1985	--	-0083
	52J/02NE	UNEX INC	30-element Assay including Au,Ag,Cu, Pb,Zn,Ni	Assess.	SA	1985	2.8876	-0084
	52J/02NE	ERIKSON, GLEN (Mine Lake Res. Inc)	py,po,cp	Assess.	DD 3 1108.8'	1986	--	-0086
CALEY LAKE	520/07SE	MOSS RESOURCES L.	--	Assess.	Mag, EM, IP, GL	1983	2.6405	-0016
	520/07SE	EDEN ROC MINERAL C.	--	Assess.	Mag, GL	1984	2.7277	-0017
	520/07SE	GOLDEN MAVERICK RES.	py,po,mag, gf	Assess.	A Mag, AEM	1984	2.7309	-0018
DONA LAKE	520/08NE	VAN HORNE GOLD EXPL.	Au,Cu,Ni, py,po,cp	Assess.	GL, Geoch	1984	2.7731	-0034
	520/08NE	HODGE, H. J. INCORP.	--	Assess.	Mag, EM, GL	1984	2.7726	-0035
	520/08NE	VAN HORNE GOLD EXPL.	py,po,cp, Au,Cu	Assess.	GL, Geoch	1984	2.7733	-0036
	520/08NE	MARIETTA RES CORP.	py	Assess.	Mag, EM, GL	1985	2.7869	-0037
	520/08NE	GOLDEN SHADOW RES.	mag,py,Au	Assess.	Mag, EM, IP	1983	--	-0038
	520/08NE	VAN HORNE GOLD EXPL.	po,mag	Assess.	Mag, EM, GL	1984	2.7732	-0039
	520/08NE	MOSS RESOURCES L.	Au,py,mag	Assess.	Mag, EM, IP, GL	1983	2.6406	-0040
	520/08NE	ONTARIO L. (591343) VAN HORNE GOLD EXPL.	py,po,mag	Assess.	Mag, EM, GL	1984	2.7730	-0041
	520/08NE	KERR ADDISON MS L.	gf	Assess.	Mag, EM, GL	1985	2.8159	-0042
	520/08NE	MOSS RESOURCES L.	Au,mo,mag, py,po,cp	Assess.	GL, Tr, Geoch	1984	2.7760	-0043
	520/08NE	GOLDEN SHADOW RES.	Au,py,po, mag,cp	Assess.	GL, Tr, DD, Geoch	1983	16.4261	-0044
	520/08NE	DOME EXPL.(CANADA) L.	py,po,mag, cp,Au	Assess.	DD 15 2052m, SA	1984	--	-0045
	520/08NE	KOVAL, D. KOMAR RESOURCES L.	Au	Assess.	GL, Geoch	1984	2.8225	-0047-A1
	520/08NE	MARIETTA RESOURCES L.	Au	Assess.	Tr, STr,	1984	--	-0050
	520/08NE	KERR ADDISON MS.L.	py,po	Assess.	DD 3 1356'	1985	--	-0051
	520/08NE	SUNBURST EXPL. L. H. J. HODGE	mag,py,po, cp,Au	Assess.	DD 12 4900'	1986	--	-0053
	520/08NE	MARIETTA RES. CORP.	py,po,cp, Au	Assess.	DD 5 1909'	1986	--	-0054
	520/08NE	HODGE, H. J. INC. GEOCANEX	--	Assess.	GL	1985	2.8737	-0055

TABLE 3.3 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
DONA LAKE	52O/08NE	KERR ADDISON MS. L.	Cu,Zn,As, Au	Assess.	GL, SA, OVD	1985	2.8758	-0056
	52O/08NE	FIRTH, GOETLER & ASSOCIATES LIMITED	--	Assess.	EM	1985	2.8941	-0057
	52O/08NE	UMEX CORP. LTD.	30-element Assay including Au,Ag,Pb, Cu,Zn	Assess.	Geoch, GL, SA	1985	2.9099	-0058
	52O/08NE	KERR ADDISON MS. L.	--	Assess.	Mag, EM	1985	2.9195	-0059
	52O/08NE	MORIN, RAY	Au,po,asp, py,cp	Assess.	DD 7 2159'	1986	--	-0060
DRAYTON TOWNSHIP	52J/04SW	NAHANNI MINES L.	Au,py,po	Assess.	DD 2 798'	1983	--	-0019
DUFFELL LAKE	52O/02NW	AMOCO CANADA L.	Au,py	Assess.	OVD, SA	1984	2.6642	-0012
	52O/02NW	AMOCO CANADA L.	Au,Ag,Cu, Ni	Assess.	OVD, SA	1984	2.6643	-0013
	52O/02NW	NORANDA EXPL. C. L.	--	Assess.	Mag, EM, GL	1984	2.7015	-0014
	52O/02NW	NORANDA EXPL. C. L.	Au,py,mo, mag	Assess.	Mag, EM, GL, SA	1984	2.7020	-0016-A1
	52O/02NW	NORANDA EXPL. C. L.	Au	Assess.	SA	1984	2.7538	-0016-C1
	52O/02NW	AMOCO CAN. PETROLEUM	Au	Assess.	OVD, SA	1984	2.6644	-0017-A1
	52O/02NW	NORANDA EXPL. C. L.	Au	Assess.	Geoch.	1984	2.8251	-0017-D1
	52O/02NW	NORANDA EXPL. C. L.	mag,py,po, Au	Assess.	Mag, EM, GL	1984	2.7019	-0018-A1
	52O/02NW	NORTHERN DYNASTY EXPLORATION L.	30-element Assay including Au,Ag,Cu, Pb,Zn	Assess.	Mag, EM, GL, Geoch	1985	2.8727	-0020
ERICKSEN LAKE	53B/15NE	ELDOR RESOURCES	Au	Assess.	Mag, EM	1985	2.8899	-0012
EVANS LAKE	52J/07SE	CUMBERLAND RESOURCES	--	Assess.	GL	1985	2.8522	-112
	52J/07SE	WESTMIN RESOURCES L.	--	Assess.	Mag, EM, Geoch, GL	1985	2.8908	-113
	52J/07SE	CUMBERLAND RESOURCES	--	Assess.	Mag, EM	1985	2.9003	-114
	52J/07SE	CUMBERLAND RESOURCES	--	Assess.	DD 1 384m	1986	--	-115
	52J/07SE	CUMBERLAND RESOURCES	--	Assess.	DD 1 360m	1986	--	-116
	52J/07SE	CUMBERLAND RESOURCES	--	Assess.	DD 1 345m	1986	--	-117
FIRSTLOON LAKE	52P/12SW	BILLITON CANADA L. HODGE, H. J. ROBERT, G. ROBERT, J. MORIN, R.	--	Assess.	Mag, EM, GL	1984	2.8033	-0020
	52P/12SW	VAN HORNE GOLD EXPL.	Au	Assess.	GL, Geoch	1984	2.7725	-0021
	52P/12SW	ONTARIO (591343) VAN HORNE GOLD EXPL.	--	Assess.	Mag, EM, GL	1984	2.7724	-0022
	52P/12SW	WALDIE, SCOTT J.	--	Assess.	Mag, EM	1986	2.8929	-0023
	52P/12SW	BILLITON CANADA L.	Au	Assess.	GL	1985	2.8707	-0024
	52P/12SW	KERR ADDISON MS.L.	--	Assess.	A Mag,AEM	1986	2.9308	-0025
	52P/12SW	KERR ADDISON MS. L.	--	Assess.	A Mag, AEM	1986	2.9309	-0026
FORESTER LAKE	53B/08NE	ONTARIO L. (581356)	--	Assess.	Mag, EM, GL	1984	2.7734	-0013
FOURBAY LAKE	52J/02SW	FALCONBRIDGE LIMITED AND STEEP ROCK RES.	py,po,cp	Assess.	DD 2 1146'	1985	--	-0068
	52J/02SW	FIRST GENERATION RESOURCES LIMITED (GRIFFIS, W. J. G.)	--	Assess.	EM	1986	2.8872	-0073
	52J/02SW	FALCONBRIDGE LIMITED STEEP ROCK RESOURCES	py,po,cp	Assess.	DD 2 361m	1983	--	-0071
	52J/02SW	NOYLE RESOURCES INC. REGIS DEVELOPMENT	Au,Ag,Cu, Zn	Assess.	DD 6 1251'	1985	--	-0069

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
FOURBAY LAKE	52J/02SW	GIANT STURGEON MINING CORPORATION	--	Assess.	Mag	1970	--	-0070
	52J/01SW	FALCONBRIDGE LIMITED	py,po	Assess.	DD 1 881'	1986	--	-0073
	52J/02SW	FALCONBRIDGE LIMITED	py,po	Assess.	DD 1 393.7'	1986	--	-0074
	52J/02SW	BAY EXPLORATION L.	Cu,Zn	Assess.	SA	1986	--	-0075
	52J/02SW	FALCONBRIDGE LIMITED	py,po,cp	Assess.	DD 1 168.2m	1986	--	-0076
	52J/02SW	HUDSON BAY EXPL. AND DEVELOPMENT C. L. STEEP ROCK RESOURCES	Au	Assess.	DD 7 4906', SA	1984	--	-0077
	52J/02SW	FALCONBRIDGE LIMITED	py,cp	Assess.	DD 27 2123'	1986	--	-0078
FRY LAKE	52O/03NW	FTR RESOURCES L.	Au,py,cp	Assess.	GL,SA	1984	2.7353	-0034
	52O/03NW	MCCANNELL, J. D.	Au,py,po,cp	Assess.	Mag, EM, GL, OVD	1984	2.6919	-0035
	52O/03NW	KERR ADDISON MINES L.	py,po,cp,Au	Assess.	GL, Tr, Geoch	1984	2.7678	-0036
	52O/03NW	SHERRITT GORDON MINES LIMITED	Au,Ag,Co,Pb,Zn,Bi,Cu,Mo	Assess.	GL, Geoch	1984	2.7623	-0037
	52O/03NW	KERR ADDISON MINES L.	25 element Assay including Au,Ag,Cu,Pb,Zn,Bi	Assess.	GL, Geoch	1984	2.8024	-0038
	52O/03NW	MCCANNELL, JAMES A.	py,po,cp	Assess.	DD 4 583'	1984	--	-0039
	52O/03NW	MCCANNELL, JAMES A.	py,po,cp	Assess.	DD 9 1081'	1984	--	-0030
HOUGHTON LAKE	52J/07SW	UMEX INC.	py,po,cp,Cu,Zn,Ag,Au,Pb	Assess.	Mag, GL, OVD, Geoch	1982	2.5628	-0024
	52J/07SW	UMEX INC.	31 element Assay including Au,Pb,Ag,Cu,Mo,Zn	Assess.	Geoch	1984	2.7134	-0025
	52J/07SW	CUMBERLAND RESOURCES REDFERN RESOURCES L. VESTOR EXPL. L.	--	Assess.	A Mag, AEM, GL, Res	1984	2.7299	-0026
	52J/07SW	UMEX INC.	32 element Assay including Au,Ag,Pb,Cu,Zn,Mo	Assess.	GL, Geoch	1984	2.7322	-0027
	52J/07SW	CUMBERLAND RESOURCES REDFERN RESOURCES L. VESTOR EXPL. L.	--	Assess.	GL	1985	2.8121	-0028
	52J/07SW	UMEX INC.	32 element Assay including Au,Ag,Cu,Pb,Zn	Assess.	Geoch	1984	2.7604	-0029-A1
JUTTEN TOWNSHIP	52J/08NW	NORONTEX EXPL. L.	Au	Assess.	Mag, EM, Pros	1986	--	-0036
	52J/08NW	WESTMIN RESOURCES L.	--	Assess.	Mag, EM	1986	--	-0037
KABIK LAKE AND PICKEREL TOWNSHIP	52F/14NE	TARBUSH LODE MINING LIMITED	py,po,Au	Assess.	DD 7 2025'	1985	--	-0042
KAPKICHI LAKE	52O/08NW	DOME EXPLORATION (CANADA) LIMITED	--	Assess.	Mag, EM	1985	2.7887	-0024
	52O/08NW	LEGION RESOURCES L.	--	Assess.	A Mag, AEM	1985	2.8195	-0025-A1
	52O/08NW	LEE, NORMAN	--	Assess.	GTr, Tr	1986	--	-0026
KAWASHE LAKE	52O/06SE	ST. JOE (CANADA) L.	--	Assess.	DD 6 3683'	1985	--	-0024
	52O/06SE	DOME EXPL. (CANADA) LIMITED	--	Assess.	Mag, EM	1985	2.8313	-0018
	52O/06SE	NORANDA EXPLORATION COMPANY LIMITED	Au,Cu	Assess.	Mag, EM, GL, OVD, Geoch	1985	2.8206	-0019

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
KAWASHE LAKE	52O/06SE	ST. JOE CANADA INC.	--	Assess.	Mag, EM, GL	1984	2.8200	-0020
	52O/06SE	ST. JOE CANADA INC.	--	Assess.	A Mag	1984	2.7053	-0021-A1
	52O/06SE	ST. JOE CANADA INC.	py,po	Assess.	DD 5 2815'	1985	--	-0022
	52O/06SE	ST. JOE CANADA INC.	py,po	Assess.	DD 4 2177'	1985	--	-0023
	52O/06SE	ST. JOE CANADA INC.	py,po,cp	Assess.	Mag	1984	--	-0025
	52O/06SE	ST. JOE CANADA INC.	py,po,cp	Assess.	DD 19 10450'	1986	--	-0028
	52O/06SE	ST. JOE CANADA INC.	py	Assess.	DD 1 131'	1986	--	-0027
	52O/06SE	ST. JOE CANADA INC.	--	Assess.	DD 13 6092'	1986	--	-0026
KERVASK LAKE	53B/14NE	NORTHERN DYNASTY EXPLORATION LIMITED	--	Assess.	Manual Work	1985	--	-0013
	53B/14NE	SULPETRO MINERALS L.	Au	Assess.	GL, SA	1985	2.8134	-0014
LITTLE OCHIG LAKE	52O/08SW	MOSS RESOURCES L.	--	Assess.	A Mag, AEM, GL	1985	2.8305	-0013
	52O/08SW	DOME EXPLORATION (CANADA) LIMITED	py,po,cp	Assess.	DD 21 9974'	1986	--	-0014
MATAPSEATAKUN LAKE	52O/02NE	GOLDEN TERRACE RES. CORPORATION	Au	Assess.	DD 4 631.58m	1985	--	-0012
MCILRAITH TOWNSHIP	52F/16NW	BP RESOURCES CANADA LIMITED	Au	Assess.	DD 1 604'	1986	--	-0067
MEEN LAKE	52O/06NW	KERR ADDISON MS. L.	--	Assess.	GL, Geoch	1984	2.7693	-0014
NEAWAGANK LAKE	53A/05SW	CANADIAN NICKEL C.L.	py,po	Assess.	DD 7 806m	1982	--	-0019
	53A/05NW	TEX U.S. OIL AND GAS INC., HODGE, J., ONTARIO (493217)	--	Assess.	GL, EM, IP, Mag	1984	2.6678	-0020
	53A/05NW	ONTARIO (620823) HODGE, J. MCCOSKIE, F.	--	Assess.	Mag, EM, GL	1984	2.8170	-0021
	53A/05NW	CANADIAN NICKEL COMPANY LIMITED	Au,Cu,Zn	Assess.	OVD, SA	1982	2.8311	-0022
	53A/05NW	CANADIAN NICKEL COMPANY LIMITED	py,po	Assess.	DD 6 2564.96	1984	--	-0023
	53A/05NW	LANDEN INVESTMENTS L.	--	Assess.	DD 3 1811'	1986	--	-0027
	53A/05NW	VAN HORNE GOLD EXPLORATION INC.	--	Assess.	DD 3 1010'	1986	--	-0028
	53A/05NW	TEX U.S. OIL AND GAS INC.	py,po,cp, Au	Assess.	DD 6 2021'	1986	--	-0026
	53A/05NW	CANADIAN NICKEL COMPANY LIMITED	py,po,mag, cp	Assess.	OVD	1985	--	-0025
	53A/05NW	TEX U.S. OIL AND GAS INC.	py,po,cp, Au	Assess.	DD 6 1961'	1984	--	-0024
NEMEIGUSABINS LAKE	53H/12SW	PLATINUM EXPLORATION CANADA LIMITED	Au,Cu	Assess.	DD 9 2010.68m	1985	--	-0019
NORTH CARIBOU LAKE	53B/15SE	ELDOR RESOURCES L.	21 element Assay including Au,Ag,Cu,Zn,Ni	Assess.	GL, Geoch	1985	--	-0016
	53B/15SE	ELDOR RESOURCES L.	--	Assess.	Mag, EM	1985	2.8679	-0019
	53B/15SE	ELDOR RESOURCES L.	--	Assess.	Mag, EM	1985	2.8678	-0018
	53B/15SE	ELDOR RESOURCES L.	Au	Assess.	DD 5 625.9m	1985	2.8672	-0017
PASHES LAKE	52G/13NW	NORANDA EXPLORATION COMPANY LIMITED	--	Assess.	STr, SA	1986	--	-0032
PENASSI LAKE	52G/14NE	PROLIFIC PETROLEUM LIMITED	Au	Assess.	SA, Mag, EM, GL, Geoch	1984	2.6324	-0074
POISSON TOWNSHIP	52J/08NW	DAOUST, RAYMOND G.	py,mag	Assess.	DD 7 2000'	1986	--	-0015
RANDALL LAKE	53B/14SE	MOSS RESOURCES L. NORSEMONT MNG. L.	--	Assess.	Mag, EM, GL	1985	--	-0018
SESEEP LAKE	53B/15NW	NORTHERN DYNASTY	py,po,cp, Au	Assess.	Manual Work DD 3 1475'	1985	--	-0011

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
SESEEP LAKE	53B/15NW	NORTHERN DYNASTY	py,po,mag, Au	Assess.	DD 6 1339'	1985	--	-0012
SIXMILE LAKE	52G/15NW	CUNNINGHAM, L. J.	py,cp	Assess.	DD 10 1499m	1985	--	-115
	52G/15NW	REDDEN, J. W.	--	Assess.	Pros.	1985	2.8349	-114
	52G/15NW	JALNA RESOURCES L.	--	Assess.	A Mag, AEM, IP	1984	2.7154	-116
SKINNER LAKE	53B/09NW	VAN HORNE GOLD EXPLORATION INC.	py,po,cp, Au	Assess.	DD 12 5005'	1985	--	-0025
	52J/02SE	MISTANGO CONSOLIDATED RESOURCES L.	py,po,cp, Au	Assess.	DD 2 500'	1986	--	-0062
	52J/02SE	MISTANGO CONSOLIDATED RESOURCES L.	py,po,cp, Au	Assess.	DD 5 1977'	1986	--	-0071
	52J/02SE	MISTANGO CONSOLIDATED RESOURCES L.	py,po,cp, Au	Assess.	DD 1 516'	1986	--	-0070
	52J/02SE	BENDERITE, ADAM	--	Assess.	STr	1986	--	-0073
TARP LAKE	520/09SE	VAN HORNE GOLD EXPL.	--	Assess.	Mag, EM, GL	1984	2.7729	-0041
	520/09SE	BILLITON CANADA L.	--	Assess.	Mag, EM, GL	1984	2.8071	-0042
	520/09SE	KERR ADDISON MS. L.	Au	Assess.	Mag, EM, GL, Geoch	1985	2.8096	-0043
	520/09SE	CINDY MAE RES. INC. HODGE, H. J.	Au	Assess.	DD 9 2079, SA	1985	2.8222	-0044
	520/09SE	VAN HORNE GOLD EXPL.	Au	Assess.	GL, Geoch	1984	2.7727	-0045-A1
	520/09SE	DOME EXPLORATION (CANADA) LIMITED	--	Assess.	Mag, EM	1985	2.7943	-0046-A1
	520/09SE	KERR ADDISON MS. L.	py,po	Assess.	DD 2 1004'	1985	--	-0047
	520/09SE	BILLITON CANADA L.	Au,Ag,W	Assess.	GL, Tr, SA	1986	2.8932	-0048
	520/09SE	VAN HORNE GOLD EXPLORATION INC.	Au	Assess.	GL, Geoch, Pros.	1985	2.8736	-0049
	520/09SE	KERR ADDISON MS. L.	Au,Cu,Zn	Assess.	GL, Mag, OVD, SA	1985	2.8757	-0050
	520/09SE	ESSO MINERALS CANADA	Au,Ag,W	Assess.	GL, Tr, STr, SA	1985	--	-0051
	520/09SE	MARIETTA RESOURCES	Au	Assess.	GL, Geoch	1985	2.8360	-0052
	520/09SE	UMEX INC.	--	Assess.	Mag, EM	1986	2.9286	-0053
	520/09SE	ESSO RESOURCES CANADA LIMITED	--	Assess.	STr	1986	--	-0054
VALORA LAKE	52G/14SE	CLINE DEVELOPMENT CORPORATION	--	Assess.	A Mag, AEM	1984	--	-104
WAPAMISK CREEK	53B/02NE	PETROMET RES. L.	Au	Assess.	EM, GL, Geoch	1984	2.7782	-0015
	53B/02NE	ONTARIO L. (581356)	--	Assess.	Mag, EM, GL	1984	2.7728	-0016-A1
	53B/02NE	PETROMET RESOURCES L.	py,po,cp	Assess.	DD 4 1728'	1986	--	-0018
WESLEYAN LAKE	520/04NE	SULPETRO MINERALS L.	Au	Assess.	DD 13 2238'	1984	--	-0022
	520/04NE	SULPETRO MINERALS L.	--	Assess.	Tr	1984	--	-0023
WHIPPER LAKE	52K/01SW	NAHANNI MINES L.	Au,py,po	Assess.	DD 1 349'	1983	--	-0032
	52K/01SW	NAHANNI MINES L.	Au,py,po, cp	Assess.	DD 1 353'	1983	--	-0033
	52K/01SW	CANADIAN NICKEL COMPANY LIMITED	--	Assess.	OVD	1972	--	-0034
WRIGHT LAKE	520/07SW	ST. JOE CANADA	py,po,cp	Assess.	DD 2 800'	1985	--	-0016
ZARN LAKE	52J/04SE	GOLDWINN RESOURCES L.	Au	Assess.	DD 7 1921'	1985	--	-0021
ZEEMEL LAKE	53B/09SW	ARMSTRONG, G. BEST, A. RIED, B. JOHNSON, S.	Au,Ag,Ni	Assess.	OVD, SA	1982	2.8199	-0026
	53B/09SW	ONTARIO L. (493217)	--	Assess.	Mag, EM	1984	2.6791	-0027
	53B/09SW	LABELLE, M. J. ARMSTRONG, G. BEST, A.	--	Assess.	Mag, EM, GL	1983	2.6901	-0028

TABLE 3.3 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
ZEEMEL LAKE	53B/09SW	VAN HORNE GOLD INC. LEGION RES. L.	Au,Zn	Assess.	Mag, EM, GL, Geoch	1984	2.7496	-0029
	53B/09SW	ONTARIO L. (493217)	—	Assess.	Mag, EM	1984	2.6625	-0030-A1
	53B/09SW	DOME EXPLORATION CANADA LIMITED	Au,py,po	Assess.	DD 1 262'	1986	--	-0035
	53B/09SW	OPEX RESOURCES INC.	Au	Assess.	Pros.	1984	--	-0036

in the marl being exposed along shorelines or covered by organic deposits in bogs. The majority of known marl reserves in the northwestern region are under water.

Calcium carbonate is widely used in industry. Applications range from a flux in blast furnaces, to a filler in plastics and paints, to the manufacture of cement. Marl, due to its comparatively low purity (80 to 90 percent $CaCO_3$), and thus low-unit value, would most likely be of use locally as a soil conditioner to neutralize acidic soil conditions.

The Surprise Lake marl occurrence, previously described by Speed *et al.* (1985) *see* Figure 3.3. The deposit is located adjacent to, and underlying, a bay of Surprise Lake, cut off from the rest of the lake by a railway embankment of the C.N.R. Superior Junction-Thunder Bay line, 0.8 km east of the rail-crossing on Highway 599, north of Ignace. Road access is available via the Great Lakes Paper Valora spur road.

The deposit was systematically sampled by two lines of auger holes at right angles to each other. The holes indicate a marl deposit measuring approximately 60 m by at least 20 m. The marl averaged 0.5 m thick and where found, overlies a coarse gravel. Two holes, reported by Speed *et al.* (1985), indicated 90 to 127 cm of marl. On the southern side of the deposit, sand overlies the marl. On the eastern side of the deposit, organic accumulations, at least 1.2 m thick, occur.

Previous work on Surprise Lake has indicated several areas of marl on the lake bed. Thicknesses are unknown. No additional work was done on the lake bed marl, due to perceived extraction difficulties.

The "on shore" marl deposit is limited in size. A small scale operation utilizing both the marl and organic matter to produce a potting soil or a conditioner for farm land may be feasible. If a sufficient thickness of marl exists under the lake, dredging to a series of settling ponds, might be economically feasible. Detailed sampling from the ice followed by marketing studies would be required to determine the feasibility of this approach.

SOAPSTONE

The term "soapstone" generally refers to a rock containing a significant amount of talc, with chlorite and carbonate as common accessory minerals. Art carvings are a well-known use of soapstone. Soapstone,

TABLE 3.4: ACTIVE OMEP PROGRAMS IN THE PATRICIA MINING DIVISION, ASSISTANCE COMMITTED BUT NOT YET PAID OUT 12/01/86

Location	Eligible Expenditures($)	OMEP Assistance($)
Beckington Lake	80 000.00	20 000.00
Coucheemoskog Lake	1 900 000.00	475 000.00
Dona Lake	465 551.00	116 388.00
Evans Lake	300 850.00	75 213.00
Firstloon Lake	445 050.00	111 263.00
Fry Lake	59 520.00	14 880.00
Handcuff Lake	9 900.00	2 475.00
Jutten Lake	15 000.00	3 750.00
Kawashe Lake	1 345 000.00	336 250.00
Little Ochig Lake	132 187.00	33 047.00
Neawagank Lake	127 500.00	31 875.00
Nemeigusabins Lake	400 000.00	100 000.00
Seseep Lake	11 600.00	2 900.00
Sixmile Lake	1 700 000.00	425 000.00
Squaw Lake	105 000.00	26 250.00
Tarp Lake	98 000.00	24 500.00
Wright Lake	2 000 000.00	500 000.00
Zeemel Lake	654 790.00	163 698.00
Total	9 870 198.00	2 467 552.00

when low in carbonate content, is resistant to chemical and thermal decomposition, and has high heat capacity. These properties have been utilized in the past when soapstone blocks were used as furnace linings, warming stones, and laboratory table tops. It has been reported that some Finnish wood stoves are built entirely of soapstone and in Vermont, soapstone-ware is produced. The carving of soapstone is well known as its workability allows shaping and carving with inexpensive equipment.

The three soapstone occurrences examined are shown in Figure 3.3. Examinations carried out by the author were aimed at determining tonnage potential and samples were collected for testing. Over the winter the samples will be tested for their suitability for stove liners, carving, and other applications. One test to date indicates improved heat retention in propane barbecues, using cobble-sized fragments in place of lava or slag. Capital costs to extract this material would be low compared to conventional quarry and finishing plant levels due to the softness of soapstone.

GRAPHITE

Graphite is a soft, black, naturally-occurring form of carbon. Flake graphite is used primarily for the manufacture of crucibles and other refractories. Large flake is approximately 80% retained on -50 mesh and sells for $630 to $1000 U.S. per metric tonne, based on a content of 85% to 95% carbon. Prices decrease to $300 to $800 U.S. per metric tonne for small flake (80% +100 mesh) with a carbon content of 80% to 95%. Crystalline powder graphite (generally -200 mesh) is used in brake linings, batteries, brushes for electric motors, dry powder metallurgy, and lubricants. Prices range from $250 to $1000 U.S. per metric tonne, the higher values representing 95% to 99% carbon. Amorphous graphite, and some powdered flake, is used in paint, refractory coatings, electrodes, mechanical engineering components, and as a source of carbon for steel manufactured from scrap. Prices for amorphous graphite powder, containing 80% to 85% carbon, are $175 to $350 U.S. per metric tonne.

Graphite deposits in northwestern Ontario would appear to be valid exploration targets, considering the value of graphite and the lack of North American production of flake graphite (Mexico produces amorphous graphite).

A deposit of flake graphite near Treelined Lake, about 60 km north of Kenora, was examined and sampled. Two graphite-bearing zones were discovered by John Harrison of Eagle River during uranium exploration in the 1960s. The zones occur adjacent to an unnamed lake (locally known as Trout Lake) located approximately 2 km southwest of Treelined Lake. Access can be gained by air from Kenora, or a 60 m long trail which leads to the southern shore of Trout Lake from the English River Road, about 5 km beyond the Separation Narrows Bridge over the English River. A few kilometres east from this trail, a logging road is under construction and will pass between Treelined Lake and "Trout Lake".

The Harrison South Showing is located adjacent to "Trout Lake". It is partially exposed in a 2.6 m wide cut, blasted in the flank of a ridge. Graphite content across the cut is variable but has been visually estimated at 10 to 15 percent. This particular location is presently held by G. Zebruck. The northeast-striking graphite zone is hosted within a biotite schist containing pegmatite layers. The unit has been interpreted as a sedimentary rock which has undergone anatexis. The graphitic horizons probably represent original carbonaceous sedimentary beds.

The Harrison North Showing consists of two groups of pits 0.8 km north of, and striking subparallel to the South Showing. The pits were not examined but were stated to contain only minor, narrow graphite-bearing zones (C.C. Storey, Geologist, Ontario Ministry of Northern Development and Mines, Kenora, personal communication, 1986). Reconnaissance geology in the vicinity of the lake resulted in the discovery of several other graphite-bearing zones; a 13 m zone on a prominent peninsula on the southeastern shore of the lake; a 13 m zone on a point of the peninsula on the most easterly part of the lake (full width obscured by overburden); a greater than 13 m zone on the peninsula at the northern end of the lake (full width not exposed as it lies under the lake); several zones up to 7 m wide on the southwestern part of the lake including a zone exposed on a large cliff face on the lake shore, as well as other smaller zones. Another graphite occurrence is located a short distance southwesterly from the lake (J. Harrison, prospector, Eagle River, personal communication, 1986).

All graphite-bearing units observed contained accessory pyrite. The pyrite has weathered sufficiently to produce a rusty colour and usually rusty biotite schist contains graphite. Minor (0.005 percent U_3O_8) uranium values also occur in several of the zones and uranium staining has been noted.

Along the strike of the Harrison South Showing, graphite-bearing schist was found over a width of 40 m. To the west of the showing, a 10 m width of graphite-bearing schist is exposed on the mainland. An island opposite this occurrence contains several feet of similar material on the shoreline. If the graphitic horizon is continuous between these two points, the true width is approximately 80 m.

A ground V.L.F. survey was run over the presumed eastern extension of the Harrison South Showing. Two distinct conductors and an additional weak conductor were found. No absolute correlation between V.L.F. conductors and graphite was possible due to lack of outcrop; however, near the showing itself, an obvious conductor was evident. It is suspected that the graphite content is not uniformly high enough to produce a single uniform conductor. Consequently, the V.L.F. response is more likely to consist of a number of small, apparently discontinuous anomalies on each line which represent more conductive zones within the graphitic horizon.

A correlation of the graphitic horizons, based on strike determinations, should be viewed with caution. The schistose horizons have been rotated and changes in strike may have occurred. Changes in strike of 3 to 9 degrees were observed over distances of 15 to 45 m in graphitic horizons.

Overall carbon content has not been determined by analysis. Visual estimates of 5 to 10 percent graphite were made. Flake size was generally greater than 0.25 mm with a significant portion of potential coarse flake.

Gossan zones (possibly indicating graphite) were noted from the air, occurring east-northeast of the Harrison South Showing and along the southwestern shore of Treelined Lake. No ground data is available on these areas. Other occurrences may be present in the area.

BUILDING AND DECORATIVE STONE

Potential building and decorative stone deposits were sampled.

The stone phase of the project consisted principally of inventory. All the highways in the area were covered as were most of the major logging roads. The inventory was ended prematurely by heavy snowfalls. All locations examined were within a few hundred metres of a good road.

A number of potential "granite" dimension stone deposits were examined which had jointing that would permit removal of blocks at least 1.3 by 1.6 by 2.6 m in size. These are described in the following sections:

Building Stone

Little Pepperbell Lake (Lake of Bays Batholith)

An exposure of 100 by 130 m of pink porphyritic granite rising 10 to 13 m above a sand plain, occurs about 18.3 km north by road from Highway 642 in a logged-out area, a few kilometres north of Little Pepperbell Lake. Joint spacing is sufficient to produce blocks 1.6 by 3.2 m with the third dimension unknown but in excess of 2 m. Several other outcrops are reported in the area, but were not examined.

Valora-Jigger Lakes Stock

The southeastern part of this stock contains several outcrops which display block sizes to 1.3 by 2 by 4 m. The rock is classified as quartz-monzonite and is pink and locally porphyritic. Phenocrysts are not a major component of the rock. Of particular concern for use as a building stone is the presence of sheeting, often 15 to 25 cm, but in one locality 1.3 m. Thin sheeting was present in most outcrops in the stock that was examined.

Basket Lake Road-Revell Batholith

An outcrop area adjacent to the southern side of Highway 17, opposite the junction with the Basket Lake Road, consists of a grey to grey-white medium- to coarse-grained granodiorite phase of the Revell Batholith. Block sizes to 1.6 by 3.2 by 4.5 m are recoverable from the area between Highway 17 and the Revell River, located about 150 m to the south. The outcrop forms a hill rising 10 to 13 m above the river.

Highway 17 - Revell Batholith

Another occurrence similar to the previous one is located 8.2 km east of the Basket Lake Road Junction on the southern side of the highway in Hodgson Township. Here an outcrop of coarse-grained grey granite rises 3 to 6 m above the level of the surrounding sand plain. Jointing is variable but blocks 2 by 4 m in plan could be quarried. The third dimension is not visible but appears to be large enough for commercial-sized blocks.

A third occurrence 1.4 km west of the abovementioned, adjacent to a Bell Canada Building, contains 1.3 by 1.3 by 1.3 m blocks.

Bending Lake Road-Revell Batholith

Porphyritic granite is exposed in road cuts and outcrops on the Bending Lake Road from 4 to 9 km south of the junction with Highway 17, west of Ignace. Sheeting is prominent in most rock cuts with subhorizontal joints spaced from 0.2 to 1.6 m. Vertical to steeply-dipping joints are widely spaced and block sizes in plan are up to 5 by 7 m.

Decorative Stone

Many locations for possible decorative stone were noted. Due to the wide variety of applications for decorative stone, and the range of personal taste in colours, patterns, and textures, almost any stone could be used for some purpose. The following descriptions are based on the author's opinion of which stones would be of commercial interest due to colour, texture, uniformity, and availability of economic volume.

Avery Township

Outcrops of black gabbros and pyroxenites occur in central Avery Township. The outcrops are along the access road to Melgund Lake, 17 km from the junction of Highway 72 and 17, and occupy an area of higher ground, with heavy bush but thin (0.3 to 1.0 m) overburden. Minor shearing is present in distinct zones but most of the rock is massive. Extensive jointing results in many blocks being about 20 to 30 cm, however, blocks up to 0.6 by 1.0 by 0.6 m were seen. It is possible that larger blocks are present which could be potential dimension stone.

Highway 642

Black gabbro, pyroxenite, and gabbro pegmatite occur in the Pike Lake Intrusion along Highway 642, 6 km west of Highway 599. Concentrations of magnetite-ilmenite and sulphide mineralization are present in several zones. The largest blocks exposed on the Highway were 30 by 30 by 45 cm. Since the intrusion is 8 by 3 km, larger blocks may possibly be found.

South of Minnitaki Lake

Porphyritic basalt ("leopard rock") occurs in several horizons in the volcanic rocks south of Minnitaki Lake. Three locations are adjacent to a logging road accessable by the Basket Lake road and are located 51 to 54 km north of Highway 17. The volume of phenocrysts varies widely, from 5 to 40 percent, and may hinder extraction of a sufficiently uniform product.

Hudson Jade

Hudson Jade is a local name given to a fuchsite-bearing quartose schist which occurs at several localities in the Hudson-Sioux Lookout area. The best known deposit, is the Rainbow Quarry (a past producer) west of Hudson. Here the fuchsite-bearing zone is 0.3 to 1.0 m wide and is exposed for a length of 50 m. The fuchsite occurs as thin continuous films along the shearing which produces slabs which have been used for flagstone facings on the buildings. Within this unit is a 15 cm horizon of green quartz, presumable due to finely-disseminated fuchsite. This material has been used in the past for decorative use either "as is" or cast in a plastic base.

Assessment files, geological reports, and field work filed at the Sioux Lookout Resident Geologist's office indicate the presence of other zones of fuchsite-bearing schist in the area. Additional work is necessary to determine the potential. Careful, thorough prospecting is the most effective method of locating additional zones. The attractive, bright-green colour of rock is unique in the region. It is believed that a small seasonal operation, producing flagstone and a range of distinctive gift items, could be viable. Marketing of the stone, to the tourist industry, as a unique product of the area, is considered the most promising approach.

PROPERTY VISITS IN THE PICKLE LAKE AREA

BY G.H. Brown

INTRODUCTION

During the period from July to December, 1986, the author was employed as a contract staff Geologist in the Resident Geologist's Office, Sioux Lookout, to carry out property visits in the Pickle Lake area, and to assist G. Stott of the Precambrian Section, Ontario Geological Survey, in a program of regional mapping. The emphasis of the regional mapping was on outlining the structure and stratigraphy of the Pickle Lake Belt and determining the structural setting of mineralization in the area.

LOCATION AND DESCRIPTION

The Pickle Lake part of the Uchi Subprovince is an irregularly-shaped, roughly northeasterly-trending greenstone belt, approximately 240 km northeast of Sioux Lookout. It forms the easterly extension of the Meen-Dempster area mapped by G. Stott in previous field seasons (Stott 1985; Stott and Wallace 1984). Several mineral occurrences (primarily gold and copper), two former gold producers (the Central Patricia and Pickle Crow Mines), and one former copper-nickel producer (the Thierry Mine) are located in this belt. Recent interest in the area has resulted in exploration being carried out on the former Pickle Crow Mine by Highland-Crow Resources Limited, and the discovery of gold in the Dona Lake area by Dome Exploration (Canada) Limited.

Metavolcanics in the Pickle Lake Greenstone Belt are predominantly basaltic in composition. Massive to pillowed flows are usually fineto medium-grained, but coarse-grained flows, sometimes indistinguishable in texture from intrusive gabbro, are relatively common in the Dona Lake area. Drill core intersections of dacite and rhyolite have been reported in a few areas but these rocks have few outcrops. A zone of dacitic tuff, lapilli-tuff, and lapillistone in the southern part of the Pickle Crow Property, and to the southeast of the property boundary, is one of the few areas where intermediate to felsic metavolcanics outcrop.

Interbedded with the mafic metavolcanics are minor clastic metasediments and magnetite-chert ironstone, which is of particular importance in the Central Patricia/Pickle Crow and Dona Lake areas. They host mineralized quartz veins and veinlets in many of the occurrences in this area and provide an essential marker horizon for outlining folds in the stratigraphy.

Intrusive into and bordering the metavolcanics of the greenstone belt are several plutons, stocks, and batholiths of tonalitic, granodioritic, and trondhjemitic composition. Recent work (Stott and Brown 1986) has shown that the contact strain aureoles surrounding these late felsic intrusive bodies have high potential for economic mineralization.

SELECTED PROPERTY DESCRIPTIONS

1. Dona Lake Prospect

This property, held jointly by Dome Exploration (Canada) Limited and Campbell Red Lake Mines Limited, lies to the east of the Ochig Lake Pluton (*see* Figure 3.4). Gold was discovered on the property in 1984 (Cohoon 1986) following extensive ground work and drilling by Dome. Recent work on the property includes extensive stripping, drilling, and the sinking of a 2-compartment exploratory shaft to the 160-m level (Cohoon 1986).

The amphibolitized, predominantly pillowed basalt and interbedded magnetite-chert ironstone on the property has been isoclinally folded about regional southeast-trending fold axes. Subsequent refolding about roughly east-northeasterly-trending axes occurs close to the tonalitic Ochig Lake Pluton. Fine-grained, disseminated, auriferous pyrrhotite and largely barren pyrite (Cohoon 1986) occurs in the folded ironstone in this vicinity. The greatest concentrations of sulphide mineralization are found within the fold axes of later flexural folds, which are more open than the earlier isoclinal folds, but both are interpreted to result from the emplacement of the Ochig Lake Pluton (Stott and Brown 1986).

A north-trending fault and a chloritic shear zone in the immediate vicinity of the mineralization have been outlined by diamond drilling (Cohoon 1986) but are not well exposed at surface. It is likely that these structures, along with folding, have had a major influence on the siting of mineralization by creating structural traps for hydrothermal fluids in the ironstone.

2. Pickle Crow Mine Area

Highland-Crow Resources Limited currently holds the claims covering the former Pickle Crow and Central

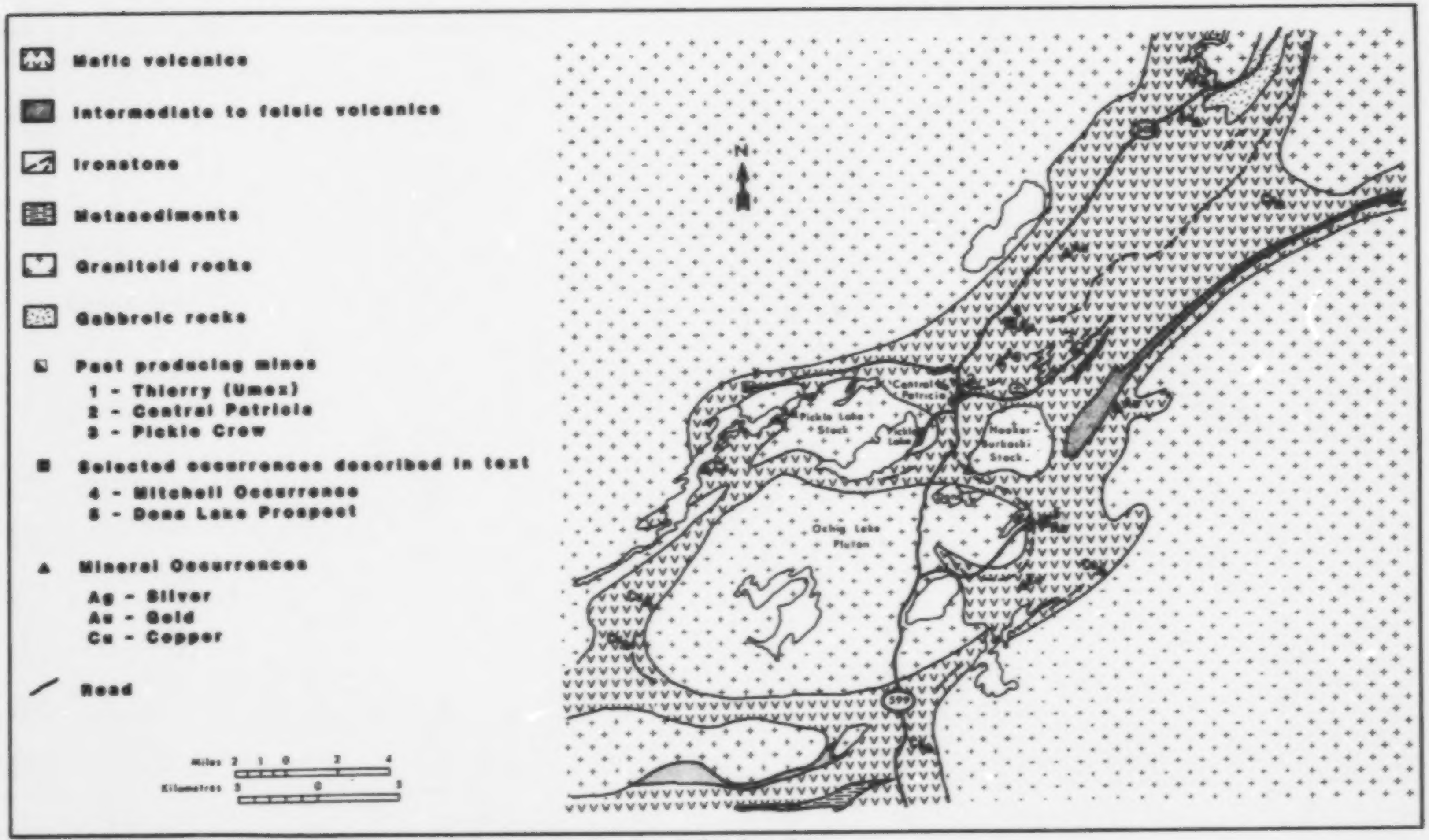

Mafic volcanics
Intermediate to felsic volcanics
Ironstone
Metasediments
Granitoid rocks
Gabbroic rocks
Past producing mines
1 - Thierry (Umex)
2 - Central Patricia
3 - Pickle Crow
Selected occurrences described in text
4 - Mitchell Occurrence
5 - Dona Lake Prospect
Mineral Occurrences
Ag - Silver
Au - Gold
Cu - Copper
Road
Miles 2 1 0 2 4
Kilometres 3 0 3
N
Central Patricia
Pickle Lake Stock
Pickle Lake
Hooker-Burkoski Stock
Ochig Lake Pluton
599

Figure 3.4. Geology and mineral occurrences in the Pickle Lake portion of the Uchi subprovince.

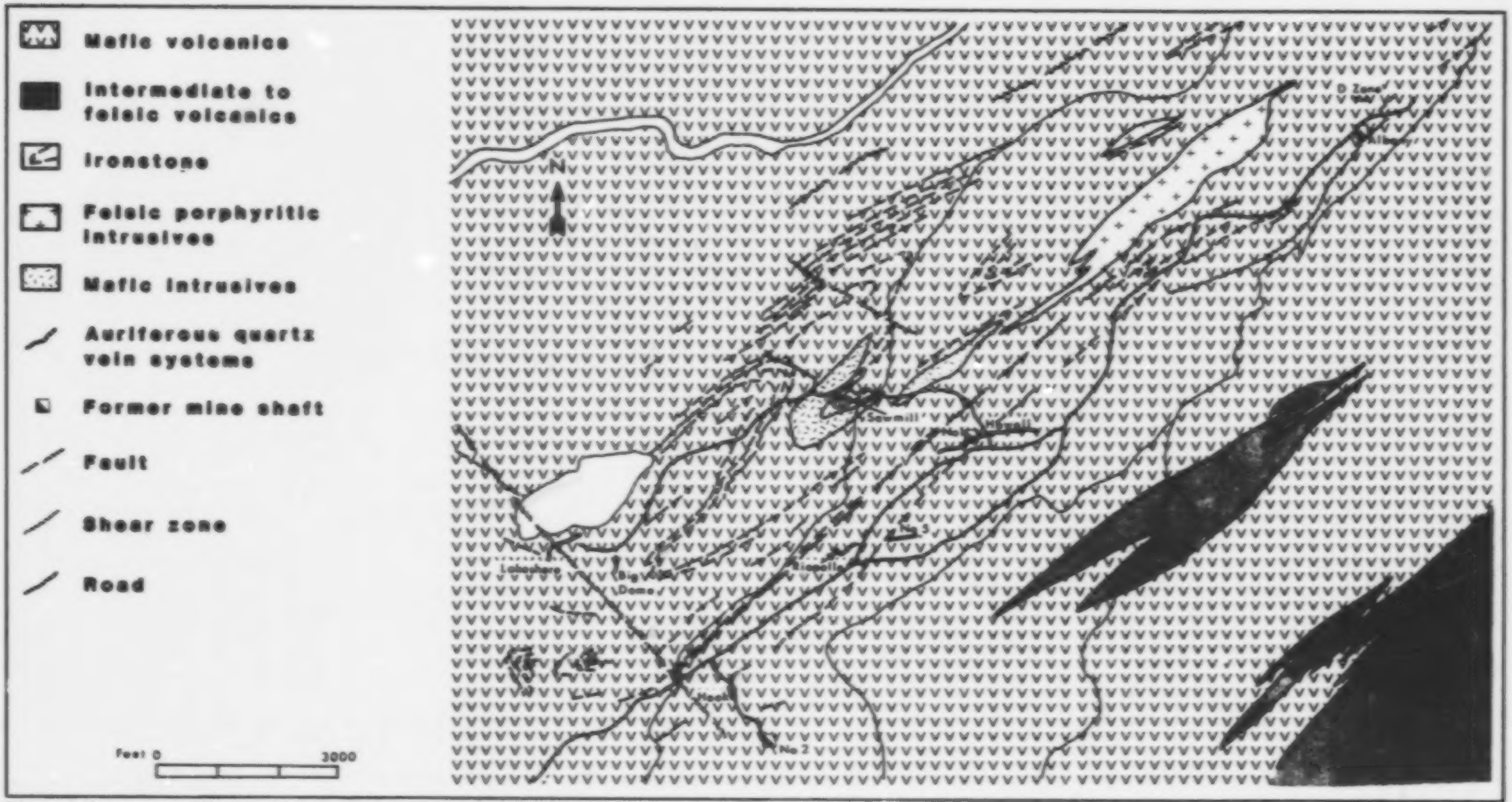

Mafic volcanics
Intermediate to felsic volcanics
Ironstone
Felsic porphyritic intrusives
Mafic intrusives
Auriferous quartz vein systems
Former mine shaft
Fault
Shear zone
Road
Feet 0
3000
N
D Zone
Sawmill
Dome
No 2

Figure 3.5. Location of several of the quartz vein systems present on the former Pickle Crow property (from Map P.1009, Crow River Area, E.G. Pye 1975).

Patricia Mines, located 4 and 11 km east of Pickle Lake, respectively. Work on the Pickle Crow claims in 1986 concentrated on stripping, sampling, and drilling to explore the several known auriferous quartz vein systems on the property. These include the Reopelle, No. 5, Big Dome, Lakeshore, Sawmill, Howell, "D" Zone veins.

Most commonly, the mineralization on the Pickle Crow Property consists of visible gold and auriferous disseminated sulphide mineralization in quartz-tourmaline veins of variable width which intruded along shear zones within pillowed to massive mafic metavolcanics. Magnetite-chert ironstone is an important component at the No. 5, Howell, Sawmill, and "D" Zone veins (*see* Figure 3.4). The granodioritic to tonalitic Hooker-Burkoski Stock in the southwest and quartz-feldspar, "Albany" Porphyry in the east are the major felsic intrusions. Dacitic tuff and lapilli-tuff, which outcrops to the south and southeast of the property, is the only area of intermediate to felsic metavolcanics on the property, although a zone of silicification affecting the basalts to the north of the Riopelle vein has often resulted in these rocks also being mapped as intermediate metavolcanics.

Ferroan dolomitization and carbonatization are particularly pervasive alterations at the Lakeshore, Big Dome, and Sawmill veins. Sulphidization has affected the ironstone at the No. 5 vein.

Early regional deformation produced open to close, southwesterly-trending folds in the metavolcanics and ironstone, and conjugate shears along which the quartz veins are intruded (Stott and Brown 1986). Where this deformation continued for prolonged periods, buckling of the quartz veins and shears resulted (examples are seen at the Lakeshore and Reopelle veins). This deformation is superimposed locally by smaller-scale, roughly north-trending, open folds resulting from the emplacement of the Hooker-Burkoski Stock. This is particularly evident at the Lakeshore and Big Dome veins.

3. Mitchell Occurrence

Located approximately 4 km northwest of the Pickle Crow Mine, this old gold occurrence is currently being examined in a joint venture by Esso Minerals Canada and Van Horne Gold Exploration Incorporated. Recent work included extensive stripping, geological mapping, and sampling.

A series of stripped outcrops in the central portion of the property expose predominantly pillowed basalt intruded by felsic quartz porphyry and late mafic dikes. In the eastern-most outcrop, narrow shears trend roughly east-northeast, subparallel to the trend of the felsic porphyritic dikes. The intensity of deformation varies along these shears. Where most intense, the felsic dikes have been reduced to carbonate-sericite schist, with minor fuchsite. Finely disseminated sulphide mineralization are primarily associated with the sheared felsic porphyry, but also occur in the mafic volcanic rocks at the contacts with the sheared dikes, and in the mafic dikes where they intersect mineralized rock. Intense, pervasive ferroan dolomitization is the most important alteration on this property and affects all rock types except the mafic dikes.

Minor faulting, two planes of close-spaced fracture cleavage, and a possible conjugate, less prominent shearing are evidence of the strong deformation on this property.

Assay results and geochemical analyses of samples collected from the various properties are pending.

ACKNOWLEDGMENTS

The cooperation and assistance of exploration company geologists in the area, in particular Dave Silversides, Peter Mills, and Ken McQueen of Highland-Crow Resources Limited, Gary Cohoon of Dome Exploration (Canada) Limited, Gerry Grant of Esso Minerals Canada, and Dave Stevenson and Dave Mullen of Umex Incorporated, is gratefully acknowledged.

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4. Thunder Bay Resident Geologist's Area, North Central Region

G.C. Patterson[1], J.F. Scott[2], J.K. Mason[3], B.R. Schnieders[3], A.D. MacTavish[3], R.J.A. Dutka[2], M.C. Kennedy[2], G.D. White[4], and P. Hinz [5]

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[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[3]Staff Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[4]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

[5]Assistant Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

INTRODUCTION

Current permanent staff in the Thunder Bay Office include: K.G. Fenwick, Regional Manager; G.C. Patterson, Resident Geologist; J.F. Scott, Resource Geologist; and A.R. Dowton, Secretary. The remainder of the staff held contract positions. The Beardmore-Geraldton Geologist Program was supervised by J.K. Mason, Staff Geologist, with assistance from C.M. Hine, Resource Geologist. B.R. Schnieders, Staff Geologist, with assistance from A.A. Speed, Resource Geologist, ran the Schreiber-Terrace Bay Geologist Program. M.C. Kennedy, Resource Geologist, initiated an industrial minerals survey of the Northwestern Region. A.D. MacTavish, Staff Geologist, and R.J.A. Dutka, Resource Geologist, ran a Cobalt-Base Metal-Platinum Group Element Study in the Atikokan area. P. Perry, Resource Geologist, prepared Geological Data Inventory Folios (GDIFs). S. Koski supervised the assessment files. J. F. Scott, Staff Geologist, monitored the Shebandowan area. G.D. White, Drill Core Library Geologist, and P. Hinz, Assistant Core Library Geologist, ran the newly constructed Thunder Bay Drill Core Library.

ACKNOWLEDGMENTS

The description of the Schreiber-Terrace Bay Geologist Program was written by B.R. Schnieders with assistance from A.A. Speed. J.K. Mason, with help from C.M. Hine, wrote the section on the Beardmore-Geraldton Geologist Program. The report on the Shebandowan area was written by J.F. Scott. The Cobalt-Base Metal-Platinum Group Elements Study in the Atikokan area was written by A.D. MacTavish and R.J.A. Dutka. M.C. Kennedy contributed the section on industrial minerals in the region. G.D. White and P. Hinz wrote the section dealing with the activities of the Drill Core Library. Technical support was provided by S. Koski, P. Perry, and A.R. Dowton.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Figures 4.1, 4.2, and 4.3 outline the boundaries of the Resident Geologist's area.

Much of the Resident Geologist staff's time was spent in consultation with prospectors and with geologists from exploration and mining companies (an average of 12 consultations a day). Other activities included field trips, tours, and property visits.

The Resident Geologist gave a total of six talks on the Hemlo Deposit to various groups and organizations, and four major field trips were given. A section for the GAC-MAC Hemlo Field Trip Guide and the Gold '86 Field Trip Guide were written. Approximately thirty, 10-minute interviews on various topics in mining were given to CBC Radio Noon and aired in Northern Ontario. An Open File Report on the amethyst deposits in the Thunder Bay area is being completed. A course on prospecting was given through Confederation College, Thunder Bay.

J.K. Mason gave four tours in the Beardmore-Geraldton area. Open File Report 5630, on gold deposits and property visits in the Beardmore-Geraldton area, was published (Mason and White 1986). Four poster displays were presented at the Ontario Geological Survey Geoscience Research Seminar and Open House, December, 1986. J.F. Scott's preliminary maps (P.2984 and P.2985, Scott and Seguin 1986) of MacGregor Township were published.

Geological staff continued to be involved in land use planning, mineral potential assessment of candidate parks, forest management agreements, environmental issues, and road placements.

Two Mining Sector Work Programs, employing a total of seven people, were organized and supervised through this office. These programs produced a Mineral Collecting Display and Slide Show, an Amethyst in Ontario Display and Slide Show, and an inventory of mineral collecting sites near Thunder Bay.

THUNDER BAY DRILL CORE LIBRARY

The Thunder Bay Drill Core Library has been in operation for a full year (since November 1, 1985) and was officially opened on June 20, 1986. The facility is designed to serve an area that extends from Manitouwadge and Marathon west to the Seine River and north to the Hudson Bay Lowlands. At present, 44 770 m of drill core has been collected or donated and is presently stored in the facility, (which has a capacity for approximately 160 000 m). As well, 131 individuals and mining/exploration company representatives have toured and/or examined drill core from numerous occurrences, prospects, and developing mines in the Thunder Bay area. All data pertaining to the drill core samples is computer catalogued as to company, location, amount, and geochemical testing. Printouts and drill logs are available on demand.

The list given below highlights drill core receiving heavy use from what are presently the most active areas in the region and includes core considered important for future reference.

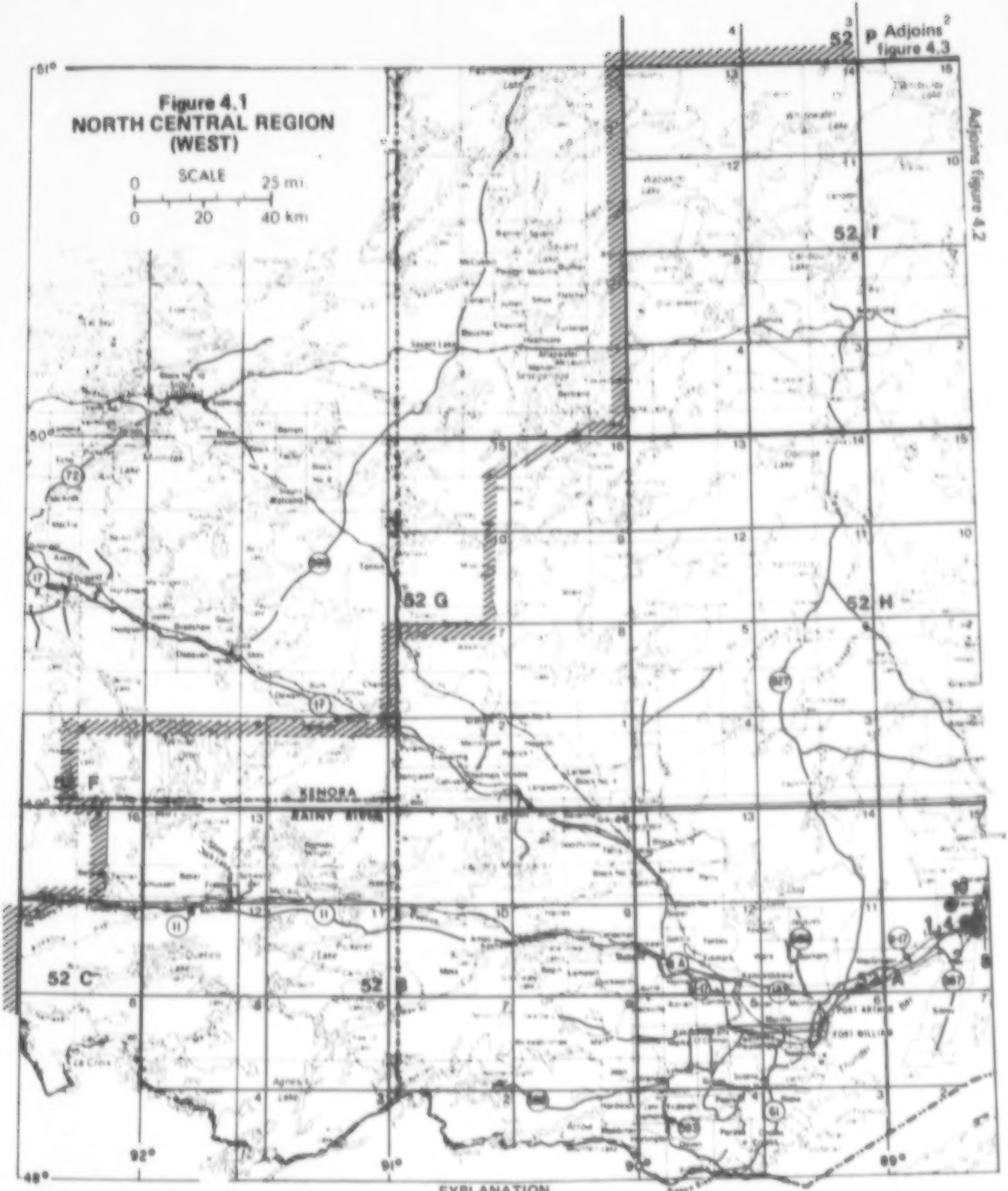

Figure 4.1
NORTH CENTRAL REGION
(WEST)

SCALE
0
25 mi
0
20
40 km
Adjoins figure 4.3
Adjoins figure 4.2
52 P
52 I
52 G
52 H
52 F
52 C
52 B
52 A
KENORA
RAINY RIVER
51°
50°
49°
48°
92°
91°
90°
89°
17
11
72
Savant Lake
Thunder Bay
Port Arthur
Fort William

EXPLANATION

● Producing Mines

1.	Jim Barrett Mine	Amethyst
2.	Dorion Amethyst Mine	Amethyst
3.	Greenoakes Mine	Au
4.	Gunnard Noyes - Diamond Willow Mine	Amethyst
5.	Page - Williams Mine (Hemlo)	Au
6.	Noranda Mines Limited (Hemlo Division)	Au
7.	Noranda Mines Limited (Geco Division)	Cu, Zn, Ag
8.	Ontario Gem Company	Amethyst
9.	Teck Corporation (Hemlo Division)	Au
10.	Thunder Bay Amethyst Panorama	Amethyst

◐ Mines and/or Properties under Development

1.	Corporation Falconbridge Copper Winston Mine	Zn, Cu, Ag, Au

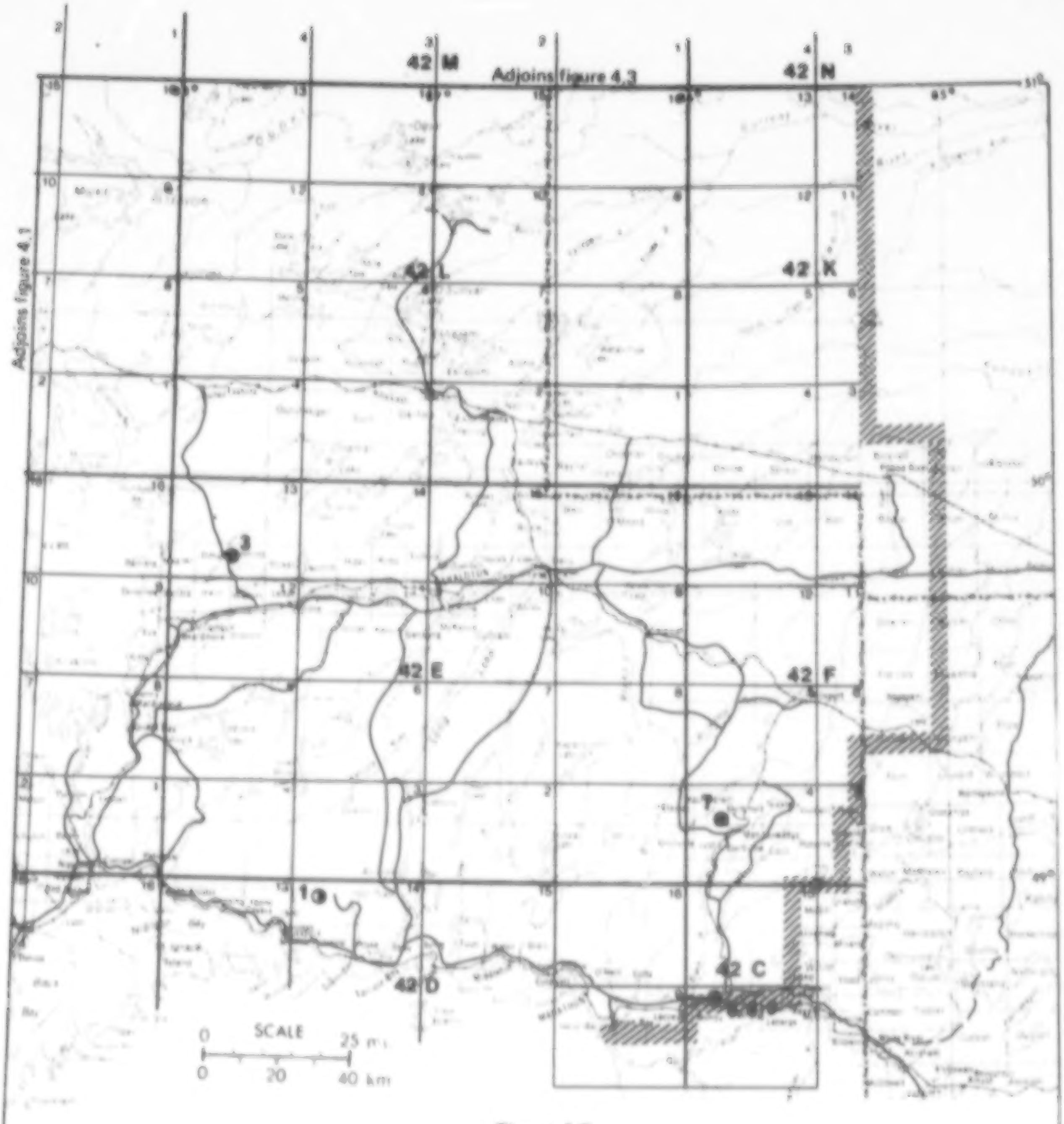
42 M
Adjoins figure 4.3
42 N
Adjoins figure 4.1
42 L
42 K
42 E
42 F
42 D
42 C
1
3
7
SCALE
0
25 mi
0
20
40 km

Figure 4.2
NORTH CENTRAL REGION
(EAST)
EXPLANATION

● Producing Mines		
1.	Jim Barrett Mine	Amethyst
2.	Dorion Amethyst Mine	Amethyst
3.	Greenoakes Mine	Au
4.	Gunnard Noyes - Diamond Willow Mine	Amethyst
5.	Page - Williams Mine (Hemlo)	Au
6.	Noranda Mines Limited (Hemlo Division)	Au
7.	Noranda Mines Limited (Geco Division)	Cu, Zn, Ag
8.	Ontario Gem Company	Amethyst
9.	Teck Corporation (Hemlo Division)	Au
10.	Thunder Bay Amethyst Panorama	Amethyst
◑ Mines and/or Properties under Development		
1.	Corporation Falconbridge Copper Winston Mine	Zn, Cu, Ag, Au

▨ Boundary of North Central Region

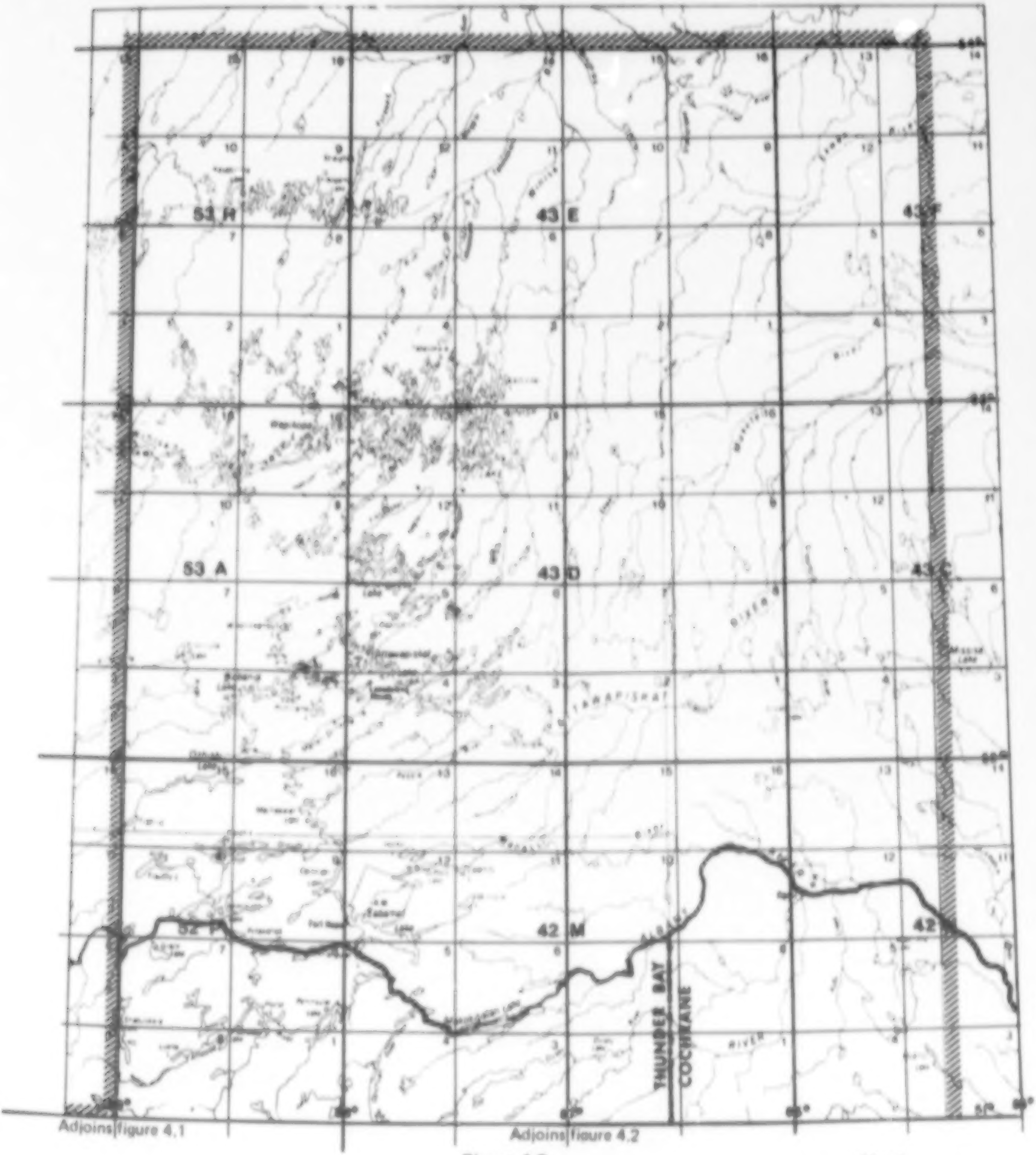
53 H
43 E
43 F
53 A
43 D
43 C
52 P
42 M
42
ATTAWAPISKAT
THUNDER BAY
COCHRANE
Adjoins figure 4.1
Adjoins figure 4.2

Figure 4.3
NORTH CENTRAL REGION
(NORTH)

0 SCALE 25 mi.
0 20 40 km

1. Lac des Iles: Pt-Pd prospect, Texas Gulf Drilling (present operator: Madeleine Mines Limited)
2. Metalore Resources assessment core: gold prospect, Irwin Township, Beardmore area
3. Winston Lake Mine, ore intersections: high grade zinc deposit, Terrace Bay area
4. Geco Mine, stratigraphic ore intersection: Cu-Pb-Zn deposit, Manitouwadge area
5. Marshall Lake Property, Corporation Falconbridge Copper, stratigraphic ore intersections: small base metal (Cu-Pb-Zn-Ag) deposit

In addition to initiating several research projects, specifically to log and assay core from certain properties previously not tested for gold mineralization, a general guide to core logging and facts on diamond drilling is being prepared and will be available in the new year.

As well, a successful attempt is being made to obtain type stratigraphic sections through the main ore horizons from all operating mines in the region.

With the exception of certain core sections held at the facility under a one-year confidentiality agreement, all data (geochemical results, etc.) generated are, and will be, available to the general public. The release of important and sensitive information will be announced well in advance.

The facility is presently staffed by Gerry White assisted by Pete Hinz. Technical and geological assistance and equipment is available for splitting, microscope examination, and some chemical testing. All inquiries may be directed to:

Drill Core Library
Ontario Ministry of Northern Development and Mines
435 James Street South
Thunder Bay, Ontario
P7C 5G6
telephone: (807) 475-1331

MINING ACTIVITIES

METALLIC MINERALS

The Geco Mine (Noranda Incorporated) in 1985 milled 1 438 000 tons to produce 22 240 tons copper, 35 040 tons zinc, 280 tons of lead and 1 325 000 ounces silver (Canadian Mines Handbook, 1986-87). Noranda Incorporated has optioned the Hucamp Mines Limited property and the Lac Minerals Limited properties (Willroy Mine, Big Nama Creek Mine, and the Willecho Mine). A large exploration program is underway. The Shebandowan Mine of Inco Limited has been maintained on a stand by basis for all of 1986.

All three Hemlo gold mines are in production. Noranda Incorporated's, Golden Giant Mine has produced 127 000 ounces of gold to June 30, 1986. The Page-Williams Mine started producing in December of 1985; total production from January, 1986, to September 30, 1986, is 384 532 ounces of gold (The Marathon Mercury, Wednesday, November 5, 1986, p.5). Teck Corporation's Teck-Corona Mine has been in continuous production in 1986.

INDUSTRIAL MINERALS

Amethyst production has come mainly from operations in MacTavish Township, northeast of Thunder Bay. These include the deposits of Gunnard Noyes (Diamond Willow Mine), the Ontario Gem Company, the Dorion Amethyst Incorporated and the Thunder Bay Amethyst Mine. Two new amethyst deposits, Marino Mountain and Pearl Lake, are close to production.

CLAIM STAKING AND EXPLORATION ACTIVITY

The amount of assessment work filed declined significantly in 1986 (Table 4.1). Exploration activity on patented or leased claims is summarized on Table 4.2. The total number of claims staked in 1986 was higher than 1985, as was the number of active claims (Table 4.3).

HEMLO AREA

A number of Ontario Mineral Exploration Program (OMEP) grant files have been released to the general public. These files contain data from deep drilling conducted in the Hemlo camp during 1983 and 1984. These drillholes suggest that the Hemlo stratigraphy continues to depth and host some mineralized sections.

ARCTIC RED RESOURCES CORPORATION—PINE BELL MINES LIMITED

The property is located 1.2 km northeast of the Teck-Corona Mine's headframe at Hemlo. A 1952.7 m hole was drilled into the eastern ore zone of the Teck-Corona Property. The hole can be summarized as:

0-1270 m: metasediments with numerous porphyry dikes or sills

1270-1789.2 m: calc-silicate and pelitic metasediments with tourmaline-rich sections from 1652.8 to 1660.7 m

1789.2-1952.7 m: biotite-rich metasediments with a molybdenite bearing unit at 1833.6 m

No significant gold assays were reported. The "felsic unit" (crystal tuff and quartz-eye sericite schist) which forms the footwall to the Hemlo Deposit is absent in this hole (Patterson *et al.* 1986).

INTERLAKE DEVELOPMENT CORPORATION PROPERTY

The property is located to the north of the Goliath Gold Mines Limited, Page-Williams Mine, and Golden Sceptre Resources Limited Properties. The main Hemlo stratigraphy dips northward onto the Interlake Development Corporation Property. A series of holes were drilled to test this horizon under a joint venture agreement between Teck Corporation and Noranda Exploration Company Limited (Canadian Mines Handbook 1986-87, p.196).

TABLE 4.1 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

A-Airborne Survey
AEM-Airborne Electromagnetic Survey
A Mag-Airborne Magnetometer Survey
Assess-Assessment Work
Non Assess-Non Assessment Work Data
CS-Core Samples
DD-Diamond Drilling (where shown the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively)
DR-Drilling Report
EM-Electromagnetic Survey
EP-Elevation Report & Profiles

Geochem-Geochemical Survey
Geophys-Geophysical Survey
GL-Geological Survey
Gr-Gravity Survey
HLEM-Horizontal Loop Electromagnetic Survey
IP-Induced Polarization
Mag-Magnetometer Survey
Man Work-Manual Work
Mech Work-Mechanical Work
OMEP-Ontario Mineral Exploartion Program
OVD-Overburden Drilling (the numbers following "OVD" indicate the number of holes drilled respectively)
PR-Property Report

Rad-Scintillometer Survey
Res-Resistivity Survey
SA-Sampling, Assays
SP-Self Potential Survey
SR-Summary Report
STr-Power Stripping
Tr-Trenching
UG-Underground Work
VLF-Very Low Frequency

Ag-Silver
Amy-Amethyst
Au-Gold
Bm-Base Metals

$CaCo_3$-Calcium/Carbonate$_3$
Cb-Columbium
Cu-Copper
fel-Feldspar
Ir-Iridium
Li-Lithium
marl-Marl
mo-Molybdenite
Nb-Niobium
Ni-Nickel
OS-Osmium
P-Phosphate
Pb-Lead

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Priske Twp. (G-631)	42D14/SE	1. Acker, Walter	Au	Assess	STr	1985	-	
Caramat Lake (G-219)	42E9/SE	2. Albert, Onesime	Au	Assess	Mech Work	1984	-	
Metcalfe Lake (G-84)	42L4/NE	3. Amax Minerals Ltd. (Canamax Resources Inc.) (Tashota Group)	Au	OMEP	DD 3-1028.4 m	1983	63.4275	
Pifher Twp. (G-141)	42E13/NW	4. Anyox Metals Ltd. (CME Resources) (Greenspar Occ.) (Nelson, J. S.)	Au	OMEP	PR	1983	63.4314	
Pic Twp. (G-630)	42D9/NW/NE	5. Arctic Red Resources Corp. (Michano Option) (National Trust Co.)	Au	Assess	GL	1985	2.8753	
Wabikoba Lake (G-620)	42C13/SW	6. Argentex-Lenora Joint Venture (Brinklow Prop.)	Au	OMEP	GL, IP, DD 6-1468.18 m	1983/84	63.4365	
Pic Twp. (G-630)	42D9/NW	7. Argo Develop. Corp. (Tara Hills Gold Resources) (Noranda Explor. Co. Ltd.)	Au	Assess	DD 3-251 m	1986	-	
Barbara Lake (G-6), Pijitawabik Bay/ Kilkenny Twp. (G-111)	42E5/SW, 52H8/NE	8a. Armeno Resources Ltd. (Newkirk-Vegan & Noranda McVitte Lithium Properties)	Li, Ta	Assess	Geochem, SA	1986	2.9225	
Lake Jean (G-64)	42E5/NW	8b. Armeno Resources Ltd.	Li, Ta	Assess	STr	1986	-	
Lower Aguasabon Lake (G-599)	42D14/NE	9. Armistice Resources Ltd.	Au	Assess	Man Work, Mech Work	1985	-	
McCaul Twp./Sabawi Lake (G-554)	52B14/SW	10. Asamera Inc.	Au	OMEP	DD 11-1624.8 m, SA	1983	63.4260	
Coughlan Lake (G-26), Tyrol Lake (G-141)	42L4/SE, 42E13/SW	11. Atlantic Mining Corp.	Au	Assess	VLF, AEM, A Mag	1985	2.8752	
Lower Aguasabon Lake (G-599)	42D14/NE	12a. Aurelian Developers Ltd.	Au	Assess	Man Work	1984	-	
Lower Aguasabon Lake (G-599)	42D14/NE	12b. Aurelian Developers Ltd.	Au	Assess	Geochem, GL, SA	1985	2.8528	
Lower Aguasabon Lake (G-599)	42D14/NE	12c. Aurelian Developers Ltd. (Armistice Resources Ltd.) (Terrace Bay Property)	Au	Assess	GL, SA	1985/86	2.8907	
Rous Lake (G-611)	42D9/NE	12d. Aurelian Developers Ltd.	Au	Assess	VLF, AEM	1983	2.8793	
Rous Lake (G-611)	42D9/NE	12e. Aurelian Developers Ltd.	Au	OMEP	Geophys	1983	63.4289	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Miminiska Lake (G-332)	52P10/SE	13a. BP Resources Canada Ltd. (Miminiska Project)	Au	Assess	VLF, Mag	1985	2.8557	
Miminiska Lake (G-332)	52P10/SE	13b. BP Resources Canada Ltd. (Selco Inc.)	Au	Assess	DD 11-1151.78 m, SA	1985	-	
McTavish Twp. (G-675)	52A10/NE	14a. Barrett, Jim H.	Pb, Zn, Amy	Assess	Man Work, Mech Work	1986	-	
McTavish Twp. (G-675)	52A10/NE	14b. Barrett, Jim H.	Pb, Zn, Amy	Assess	Man Work	1986	-	
Nesting Lake (G-342)	52P10/NE	15. Bayne, A. S. (Szetu, S. S.) (Anaconda Can. Explor. Ltd.)	Au	Assess	DD 2-188.4 m	1985	-	
Paipoonge Twp. (G-680)	52A6/SW	16. Belluz, B. (Lily of the Valley Prop.)	Pb, Zn, Ag, Amy	Assess	Man Work, Mech Work, STr	1985	-	
Molson Lake/Rous Lake (G-611)	42C12/NW, 42D9/NE	17. Bel Air Resources Inc. (Westfield Minerals Ltd.) (Belont Resources Inc.)	Au	Assess	DD 4-544.38 m	1985	-	
Norway Lake (G-545), Richardson Lake (G-553)	52G3/SW/SE	18. Billiton Canada Ltd. (Red Paint Lake Property)	Au, Ag, Cu, Pb, Zn	OMEP	Geochem	1984	63.4361	
Rickaby Twp. (G-161), Lapierre Twp. (G-65)	42E13/SE, 42E14/SW	19. Blue Falcon Mines Ltd.	Au	Assess	VLF, Mag	1986	2.9178	
Santoy Lake (G-612)	42D15/NW	20. Blue Ridge Resources Ltd.	Au, Cu, Zn	Assess	Geochem, GL, SA	1985	2.8726	
Molson Lake (G-603)	42C12/NW	21. Boos, B. (Seemar Mines Ltd.) (Adnaron Resources Ltd.)	Au	OMEP	DR, Tr, GL, DD 5-800.1 m SA	1984	63.4439	
Seeley Lake (G-613)	42D16/SW	22. Boram Oil Ltd. (Mineta Resources Ltd.) (Filo, K.)	Au	Assess	DD 2-146.0 m	1985	-	
Garden Lake (G-721)	52H12/SW	23. Broome, A.	Au, PGE	Assess	Mech Work	1985	-	
Seeley Lake (G-613)	42D16/SW	24a. Brown McDade Resources Ltd.	Au	Assess	Man Work	1985	-	
Seeley Lake (G-613)	42D16/SW	24b. Brown McDade Resources Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	GL, Mag	1985	2.8533	
Garden Lake (G-721)	52H12/SW	25a. Bumbu, Costy	Pt, Pd, Cu, Ni	Assess	Mech Work	1985	-	
Lake Jean (G-64)	42E5/NW	25b. Bumbu, Costy	Li	Assess	Mech Work	1986	-	
Metcalfe Lake (G-84)	42L4/NE	26a. Callisto Minerals Inc. (Yzerdraat, W.)	Au	Non-Assess	Geochem	1985	2.8702	
Metcalfe Lake (G-84)	42L4/NE	26b. Callisto Minerals Inc. (Yzerdraat, W.)	Au	Non-Assess	SA	1985	2.8814	
Metcalfe Lake (G-84)	42L4/NE	26c. Callisto Minerals Inc. (Yzerdraat, W.)	Au	Assess	GL	1985	2.9221	
Metcalfe Lake (G-84)	42L4/NE	26d. Callisto Minerals Inc. (Yzerdraat, W.)	Au	Assess	Man Work, Mech Work	1986	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Metcalfe Lake (G-84)	42L4/NE	26e. Callisto Minerals Inc. (Yzerdraat, W.)	Au	Assess	SA	1986	2.9377	
Lapierre Lake/ Hipel Twp. (G-65), Treptow Twp. (G-434)	42E14/SW/ SE	27. G. Calverley & Son Ltd.	Au	Assess	VLF	1986	2.9394	
Priske Twp. (G-631)	42D14/SW/ SE	28. Camber Explor. Co. Ltd. (Killick Gold Co. Ltd.) (Schreiber Prop.)	Au	Assess	Geochem	1986	2.9151	
Pic Twp. (G-630), Lecours Twp. (G-2863)	42D9/NE	29. Cameron, Kirk (Nexus Resources)	Au	OMEP	IP	1983	63.4406	
Seeley Lake (G-613)	42D16/SW	30. Can-Tel Mineta Joint Venture (Noranda Explor. Co. Ltd.) (Filo, K.)	Au	Assess	GL, SA	1985	2.8635	
Castlewood Lake (G-22), Martin Lake (G-79)	42E13/NW/ NE	31a. Canadian Nickel Co. Ltd. (Conglomerate Lake Project)	Au	Assess	SA, Geochem, GL	1984	2.9291	
Leduc Twp. (G-169)	42E12/NE	31b. Canadian Nickel Co. Ltd. (Solomon's Pillars Pros.)	Au	Assess	DD 2-181.06 m	1986	-	
Moss Twp. (G-676)	52B10/SE	31c. Canadian Nickel Co. Ltd. (Burchell Lake Project)	Au	Assess	GL, Mag, SA	1983	2.9019	
Moss Twp. (G-676)	52B10/SE	31d. Canadian Nickel Co. Ltd. (INCO)	Au	Assess	DD 1-83.21 m	1984	-	
Ramsay-Wright Twp. (G-573)	52B14/NW	31e. Canadian Nickel Co. Ltd. (Pettigrew Property)	Au	Assess	DD 2-125.58 m	1983	-	
Ramsay-Wright Twp. (G-573)	52B14/NW	31f. Canadian Nickel Co. Ltd. (Pettigrew Property)	Au	Assess	SA	1983	2.9174	
Ware Twp. (G-698)	52A12/SE, 52A11/SW	31g. Canadian Nickel Co. Ltd.	Au	Assess	VLF, Mag	1986	2.9229	
Rous Lake (G-611)	42D9/NE	32a. Captain Cons./ Koala Property (Homestake Minerals Dev. Co.)(Murray, B.)	Au	Assess	GL, SA	1985	2.9021	
Rous Lake (G-611), Wabikoba Lake/Molson Lake (G-620), Lorna Lake (G-598)	42D9/NE, 42C12/NW, 42D16/SE	32b. Captain Cons. Resources/ Koala Resources Ltd. (Murray, B., in trust) (Gowan Creek Project)	Au	Assess	Geochem, VLF, SA	1986	2.8792	
Wabikoba Lake (G-620)	42C13/SW	32c. Captain Cons. Resources Ltd./ Koala Resources	Au	OMEP	EM, Mag	1983	63.4368	
Pifher Twp. (G-141), Elmhirst Twp. (G-162)	42E13/SW	33a. Carling Gold Resources Inc.	Au, Ag, Cu	Assess	DD 9-985.88 m	1985	-	
Pifher Twp. (G-141), Elmhirst Twp. (G-162)	42E13/SW	33b. Carling Gold Resources Inc.	Au, Ag, Cu	Assess	SA	1985	2.8823	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Seeley Lake (G-613)	42D16/SW	34. Carlson-Laurasia Joint Venture (Noranda Explor. Co. Ltd.)	Au	Assess	Geochem, GL, SA	1985	2.8660	
Lorna Lake (G-598), Seeley Lake (G-613), Cirrus Lake (G-587)	42D16/SE/SW/NE	35a. Carlson Mines Ltd. (Roy, Rejean, et al) (Marathon Project)	Au	Assess	Geochem, GL, VLF, SA	1986	2.8988	
Lorna Lake (G-598)	42D16/SE	35b. Carlson Mines Ltd. (Korba, Ed J.)	Au	Assess	Geochem, GL, SA	1986	2.8900	
Seeley Lake (G-613)	42D16/SW	35c. Carlson Mines Ltd. (Carlson-Laurasia Resources)	Au	OMEP	GL	1984	63.4492	
Wabikoba Lake (G-620), White Lake (N) (G-622)	42C13/SW/SE	36. Cassex Resources Ltd. (Kilembe Resources Inc.)	Au	Assess	Geochem, VLF, Mag	1985	2.8794	
McTavish Twp. (G-675)	52A10/NE	37a. Castagne, Alphonse A.	Amy	Assess	Man Work, Mech Work	1985	-	
McTavish Twp. (G-675)	52A10/NE	37b. Castagne, Alphonse A.	Amy	Assess	Man Work, Mech Work	1985	-	
McTavish Twp. (G-675)	52A10/NE	37c. Castagne, Alphonse A.	Amy	Assess	Man Work, Mech Work, STr	1986	-	
McTavish Twp. (G-675)	52A10/NE	37d. Castagne, Alphonse A.	Amy	Assess	Man Work, Mech Work, STr	1986	-	
Molson Lake (G-603)	42C12/NW	38a. Caulfield Resources Ltd. (Caulfield-Vulcan Joint Venture)	Au	OMEP	Mag, Geochem	1983	63.4[illegible]2	
Molson Lake (G-603)	42C12/NW	38b. Caulfield Resources Ltd. (Caulfield-Vulcan Joint Venture)	Au	OMEP	Geochem, SA	1984	63.4392	
Hutchison Twp. (G-571)	52B14/SW	39a. Chapman, S. F.	Au	Assess	SA	1985	2.9105	
Sabawi Lake (G-554), Hutchison Twp. (G-571)	52B14/SW	39b. Chapman, S. F.	Au	Assess	STr, Mech Work	1985	-	
Sabawi Lake (G-554), Hutchison Twp. (G-571)	52B14/SW	39c. Chapman, S. F.	Au	Assess	Man Work	1985	-	
Legault Twp. (G-170)	42E11/NE	40. Checkley, F. A.	Au	Assess	STr	1986	-	
Miminiska Lake (G-332), Nesting Lake (G-342), Ferguson Lake (G-249), Frond Lake (G-252)	52P10/SE/NE, 52P9/NW/SW	41. Cominco Ltd. (Niska Prop.)	Au	Assess	SA, Geochem	1986	2.9108	
Santoy Lake (G-612)	42D15/NW	42. Corolla Resources Ltd.	Au	Assess	Geochem, GL, SA	1985	2.8725	
Tuuri Twp. (G-635)	42D15/SW	43. Coronet Resources Ltd.	Au	OMEP	Geochem, GL	1983/84	63.4396	
Pays Plat Lake (G-606)	42D14/NW	44. Corp. Falconbridge Copper	Bm, Cu, Zn	Assess	DD 4-2609.9 m	1985	-	
Walters Twp. (G-171), Irwin Twp. (G-164)	42E12/NW	45. Coulson, Hugh	Au	Assess	AEM, VLF, A Mag	1985	2.8842	
Irwin Twp. (G-164)	42E12/NW	46a. Cowan, M. F.	Au	Assess	SA	1984	2.9318	
Tyrol Lake (G-141)	42E13/SW	46b. Cowan, M. F.	Au	Assess	Man Work, Mech Work	1986	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Tyrol Lake (G-141)	42E13/SW	46c. Cowan, M. F.	Au	Assess	SA	1986	2.9299	
Tyrol Lake/Pifher Twp. (G-141)	42E13/SW	47. Cox, N. (Lassila, P.) (Thorsteinson, D.)	Au	Assess	STr	1985	-	
Maryjane Lake (G-80)	52H9/SE	48. Cox, William L.	Au	Assess	STr	1986	-	
Vincent Twp. (G-163)	42E12/NE	49a. Craskie Mines Ltd.	Au	OMEP	EP	1983	63.4273	
Vincent Twp. (G-163)	42E12/NE	49b. Craskie Mines Ltd. (Vega Occ.) (Tenacity Option)	Au	OMEP	DR, SA	1984	63.4468	
Powell Lake (G-549)	52B7/NW	50a. Cumberland Resources Ltd. (Powell Lake Property)	Au	Assess	GL	1985	2.8906	
Powell Lake (G-549)	52B7/NW	50b. Cumberland Resources Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	Geochem, SA	1985/86	2.9406	
Tuuri Twp. (G-635)	42D15/SW	50c. Cumberland Resources Ltd.	Au	OMEP	SA	1984	63.4423	
Saganagons Lake (G-555)	52B7/SW	51a. Curran Bay Resources Ltd.	Au	Assess	DD 15-914.4 m, SA	1984	-	
Saganagons Lake (G-555)	52B7/SW	51b. Curran Bay Resources Ltd.	Au	Assess	GL, VLF, Mag	1985	2.8832	
Nesting Lake (G-342)	52P10/NE	52. Darius Gold Mines Inc. (Gold Fields Canadian Mining Ltd.) (Keezhik Creek Prop.)	Au	Assess	GL, VLF, AEM, A Mag	1986	2.9217	
Seeley Lake (G-613)	42D16/SW	53. Delhi Pacific Resources Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	GL	1985	2.8589	
Wabikoba Lake (G-620), White Lake (N) (G-622)	42C13/SW/ SE	54. Denom Resources Inc. (McGowan, R.)	Au	Assess	SA	1983	2.9047	
Wabikoba Lake (G-620)	42C13/SW	55. Dolphin Explors. Ltd.	Au	Assess	Geochem, HLEM, SA, OVD 24-773.5 m	1985	2.8590	
Wabikoba Lake (G-620)	42C13/SW	56a. Eden Roc Mineral Corp. (Firetower Property)	Au	OMEP	Tr	1984	63.4408	
Wabikoba Lake (G-620)	42C13/SW	56b. Eden Roc Mineral Corp. (Firetower Property)	Au	Assess	Tr, SA	1984	2.8567	
Tuuri Twp. (G-635)	42D15/SW	57a. Eldor Resources Ltd.	Cu, Zn, Ag, Au	Assess	Geochem, Tr, GL, EM, Mag, SA	1986	2.9173	
Tuuri Twp. (G-635)	42D15/SW	57b. Eldor Resources Ltd.	Zn, Cu, Ag, Au	Assess	DD 5-543.2 m	1986	-	
Pic Twp. (G-630)	42D9/SE	58a. FGM Resources Inc.	Au	Assess	GL	1985	2.8669	
Pic Twp. (G-630)	42D9/NW	58b. FGM Resources Inc.	Au	Assess	GL	1985	2.8670	
Pic Twp. (G-630)	42D9/SW/ NW	58c. FGM Resources Inc.	Au	Assess	AEM, VLF, A Mag	1985	2.6780	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Syine Twp. (G-634)	42D15/SW	59a. Ferguson, A.	Au, Ag	Assess	Mech Work	1985	-	
Syine Twp. (G-634)	42D15/SW	59b. Ferguson, A.	Au, Ag	Assess	Man Work, STr	1986	-	
Syine Twp. (G-634)	42D15/SW	59c. Ferguson, A. (Mogo Property)	Au, Ag	Assess	VLF, Mag	1986	2.9360	
Syine Twp. (G-634)	42D15/SW	60. Ferguson, Jon	Au, Ag	Assess	Mech Work	1985	-	
Finlayson Lake (G-528), Freeborn Twp. (G-570)	52B13/NE/SE	61a. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Man Work, Mech Work, STr	1985	-	
Freeborn Twp. (G-570)	52B13/SE/SW	61b. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	DD 1-42.7 m	1985	-	
Freeborn Twp. (G-570)	52B13/SE/SW	61c. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	SA	1985	2.8617	
Lower Aguasabon Lake (G-599)	42D14/NE	62. Flint Rock Mines Ltd. (Ansell Lake Property)	Au, Cu, Ag	Assess	GL, SA	1985	2.8569	
Wapitotem Lake (G-447), Owen Lake (G-364), Springer Lake (G-413), Bartman Lake (G-202), Mameiginess Lake (G-316), Benjamin Lake (G-3176)	43D5/NW, 43D6/SW, 43D5/NE, 43D12/SE/SW, 43D6/NE	63. Forester Resources Inc. (Blue Falcon Mines Ltd.) (Bogert, John)	Au, Ag, Cu, Zn, Pb	Assess	AEM, VLF, A Mag	1985	2.8800	
Middle Fox Lake/ Yesno Twp. (G-85)	42D13/NE	64. Fournier, E.	Ag, Amy	Assess	Mech Work	1985	-	
Strey Twp. (G-633)	42D14/SE	65. Franklin Resources Ltd. (Terrace Bay Project)	Au, Ag	Assess	Geochem, GL, SA	1986	2.9038	
Hagey Twp. (G-661)	52B9/NE	66a. GLE Resources Ltd. (Calvert, Dan) (Lincoln Resources Inc.)	Au	Assess	DD 2-304.49 m, Man Work	1985/86	-	
Haines Twp. (G-662)	52B9/NW	66b. GLE Resources Ltd. (Lincoln Resources Inc.)	Au	Assess	SA	1985	2.8722	
Veekay Lake (G-440)	42M12/SE	67. Geddes Resources Inc. (Reserve Creek Property)	Au	OMEP	Geochem, IP	1983	63.4338	
Tyrol Lake (G-141)	42E13/SW	68a. Gervais, A. (Mitto, A.)	Au	Assess	Mech Work	1985	-	
Tyrol Lake (G-141)	42E13/SW	68b. Gervais, A.	Au	Assess	STr	1985	-	
Klotz Lake (G-295)	42F13/SW	69a. Getty Canadian Metals Ltd.	Au	OMEP	DR	1983	63.4367	
Klotz Lake (G-295)	42F13/SW	69b. Getty Canadian Metals Ltd.	Au	Assess	DD 20-3234.4 m	1983/84	-	
Klotz Lake (G-295)	42F13/SW	69c. Getty Canadian Metals Ltd.	Au	Assess	DD 1-45.8 m	1985	-	
Castlebar Lake (G-220), Pagwachuan Lake (G-368)	42E16/SE, 42E9/NE	70. Glenora Resources Inc.	Au	Assess	VLF, Mag	1985	2.8649	
Dawson Road Lots (G-649)	52A12/SW	71. Godzik, Alex	Au	Assess	Man Work	1985	-	
Miminiska Lake (G-332), Nesting Lake (G-342)	52P10/SE/NE	72a. Gold Fields Canadian Mining Ltd. (Darius Gold Mines Inc.)	Au	Assess	VLF, A Mag, AEM	1985	2.8754	

TABLE 4.1 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Nesting Lake (G-342)	52P10/NE	72b. Gold Fields Canadian Mining Ltd. (Darius Gold Mines Inc.)	Au	Assess	DD 23-3950.06 m	1986	-	
Rous Lake (G-611), Molson Lake (G-603)	42D9/NE, 42C12/NW	72c. Gold Fields Canadian Mining Ltd.	Au	OMEP	Gr, Mag	1984	63.4410	
Snowdrift Lake (G-402)	52P10/SW	72d. Gold Fields Canadian Mining Ltd. (Albany West Prop.)	Au	Assess	AEM, Mag	1986	2.9216	
Pic Twp. (G-630)	42D9/NE	73a. Golden Range Resources Inc.	Au	Assess	STr	1985	-	
Pic Twp. (G-630)	42D9/NW/ NE	73b. Golden Range Resources Inc. (Hudson Bay Explor. & Dev. Co. Ltd.)	Au	Assess	Geochem	1985	2.8680	
Pic Twp. (G-630)	42D9/NW/ NE	73c. Golden Range Resources Inc. (Hudson Bay Explor. & Dev. Co. Ltd.)	Au	Assess	Res, Geochem, GL, IP, SA	1985	2.8682	
Upper Aguasabon Lake (G-617)	42E3/SE	73d. Golden Range Resources Inc. (Zenmac Prop.)	Cu, Zn, Au, Ag	Assess	Geochem, GL, SA	1985	2.8766	
Castlebar Lake (G-220), Klotz Lake (G-295)	42E16/SE, 42F13/SW	74. Golden Tiger Mining Explor. Co. Ltd. (Gabbro Lake Property)	Au	Assess	DD 11-929.04 m, SA	1986	-	
Norway Lake (G-545)	52G3/SW	75. Golden Winner Resources Ltd.	Au	Assess	DD 9-449.9 m	1986	-	
Powell Lake (G-549)	52B7/NW	76. Grand Portage Resources Ltd. (Gracey, K. A.)	Au	Assess	GL, SA	1985	2.8715	
Pic Twp. (G-630)	42D9/NW	77. Grant Explor. Resources Joint Venture (Pezim, M.) (Noranda Explor. Co. Ltd.)	Au	Assess	GL, Mag, SA	1985	2.8625	
Lower Aguasabon Lake (G-599)	42D14/NE	78. Green River Resources Ltd.	Au	OMEP	PR	1983	63.4362	
Strey Twp. (G-633)	42D14/SE	79a. Greyhawk Resources Ltd.	Au, Ag	OMEP	PR	1983	63.4342	
Strey Twp. (G-633)	42D14/SE	79b. Greyhawk Resources Ltd.	Au, Ag	Assess	GL, HLEM, SA	1985	2.9113	
MacGregor Twp. (G-672)	52A10/SW	80. Greive, M. D.	Amy	Assess	Man Work, Mech Work	1985	-	
Middle Fox Lake/ Yesno Twp. (G-85)	42D13/NE	81. Halonen, L.	Amy	Assess	Man Work	1986	-	
Syine Twp. (G-634)	42D15/SW	82. Hamel, J. R.	Au, Ag	Assess	Man Work, Mech Work	1985	-	
Wabikoba Lake (G-620)	42C13/SW	83. Harlin Resources Ltd.	Au	OMEP	DR, SA, DD 5-500 m	1983/85	63.4388	
Oboshkegan Twp. (G-173)	42L4/NE	84a. Harte Resources Ltd. (Crescent Lake Prop.)	Au	Assess	Man Work	1985	-	
Oboshkegan Twp. (G-173)	42L4/NE	84b. Harte Resources Ltd. (Crescent Lake Property)	Au	Assess	Geochem, GL, SA	1985	2.8686	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Oboshkegan Twp. (G-173)	42L4/NE	84c. Harte Resources Ltd. (Crescent Lake Property)	Au	Assess	DD 5-441.46 m, SA	1986	-	
Walters Twp. (G-171)	42E12/NE	84d. Harte Resources Ltd.	Au	Assess	GL, EM, Mag, SA	1984	2.8147	
Tuuri Twp. (G-635)	42D15/SW	85. High Ridge Resources Inc. (Ransbury, B.)	Au	Assess	Geochem, SA	1985	2.8627	
Walsh Twp. (G-636)	42D15/SE	86a. Highwood Resources Ltd. (Dead Horse Creek Project) (Belisle, O.) (Ternowesky, J.)	RE	Assess	GL, SA, Geochem	1985	2.8901	
Walsh Twp. (G-636)	42D15/SE	86b. Highwood Resources Ltd. (Dead Horse Creek Project) (Belisle, O.) (Ternowesky, J.)	RE	Assess	GL	1986	2.9263	
Pifher Twp./Tyrol Lake (G-141)	42E13/SW	87a. Hillsborough Explor. Ltd. (Cowan Prop.)	Au, Ag, Cu	Assess	Geochem	1985	2.8695	
Pifher Twp./Tyrol Lake (G-141)	42E13/SW	87b. Hillsborough Explor. Ltd.	Au, Ag, Cu	Assess	DR, SA, DD 1-54.87 m	1986	-	
Meader Twp. (G-168)	42E13/SW	88a. Holmwood Resources Ltd. (Pirum Lake Property)	Au, Ag, Cu	Assess	DD 2-78.03 m	1985	-	
Meader Twp. (G-168)	42E13/SW	88b. Holmwood Resources Ltd. (Pirum Lake Property)	Au, Ag, Cu	Assess	DD 3-103.3 m	1985	-	
Colter Twp. (G-477)	42E11/NW	89a. Hudson Bay Explor. & Dev. Co. Ltd. (Partridge Lake Project)	Au	Assess	VLF, OVD 3-20.2 m	1986	2.9197	
Legault Twp. (G-170)	42E11/NW	89b. Hudson Bay Explor. & Dev. Co. Ltd. (Partridge Lake Project)	Au	Assess	VLF	1986	3.9196	
Treptow Lake/Kirby Twp. (G-434)	42E14/SE	89c. Hudson Bay Explor. & Dev. Co. Ltd. (Dumus Lake Project)	Au	Assess	DD 9-250.4 m, SA	1986	-	
Moss Twp. (G-676)	52B10/SW	90a. Huronian Mines Ltd. (Ardeen Mines Property)	Au	Assess	STr	1986	-	
Moss Twp. (G-676)	52B10/SW	90b. Huronian Mines Ltd. (Ardeen Mines Property)	Au	Assess	STr	1986	-	
Lorna Lake (G-598), Rous Lake (G-611)	42D16/SE, 42D9/NE	91. Ican Resources Ltd.	Au	OMEP	PR	1983	63.4401	
Rous Lake (G-611)	42D9/NE	92. Int.'l Corona Resources Ltd. (Galveston Petroleums Ltd.)	Au	OMEP	Geochem, GL	1983	63.4284	
Walsh Twp. (G-636), Tuuri Twp. (G-635)	42D15/SE/SW	93. Int.'l Wildrose Resources Ltd. (McKellar Harbour Prop.)	Cu, Zn, Au, Ag	Assess	Geochem, GL, SA	1985	2.8701	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hutchison Twp. (G-571), McCaul Twp./Sabawi Lake (G-554), Trottier Twp./Crooked Pine Lake (G-519), Schewenger Twp. (G-574), Freeborn Twp. (G-570), Baker Twp./Miranda Lake (G-543)	52B14/SW/ SE, 52B 13/SE/SW	94. Interquest Resources Corp.	Au	Assess	AEM, VLF, A Mag	1985	2.8578	
Duckworth Twp. (G-638), Laurie Twp. (G-669)	52B9/SE	95a. Jalna Resources Ltd. (Gold Creek Project) (Goldore Joint Venture)	Au	OMEP	GL, Geochem, SA, IP, Mag	1983/84	63.4394	
Duckworth Twp. (G-638), Laurie Twp. (G-669), Batwing Lake (G-699)	52B9/SE, 52B8/NE	95b. Jalna Resources Ltd. (Gold Creek Project)	Au	OMEP	AEM, A Mag, VLF	1985	63.4517	
Moss Twp. (G-676)	52B10/SE	96. Jet Mining Explor. Inc. (Belisle, O.) (Hibbart, N.)	Au	Assess	AEM, A Mag, VLF	1986	2.9451	
Errington Twp. (G-479)	42E11/NE	97. Johansen, T.	Au	Assess	Man Work, Mech Work, STr	1985	-	
Pays Plat Lake (G-606)	42D14/NW	98. Kalrock Developers Ltd. (Gumboat Lake Project)	Au	Assess	VLF, Mag	1985	2.8694	
MacGregor Twp. (G-672)	52A10/SW	99. Karkkainen, Alpo	Pb, Zn, Amy	Assess	VLF	1985	2.8596	
Wabikoba Lake (G-620)	42C13/SW	100a. Kelley-Kerr Energy Corp. (Noranda Explor. Co. Ltd.)	Au	Assess	Mag	1985	2.8888	
Wabikoba Lake (G-620)	42C13/SW	100b. Kelley-Kerr Energy Corp. (Noranda Explor. Co. Ltd.)	Au	Assess	VLF	1986	2.9088	
Wabikoba Lake (G-620)	42C13/SW	100c. Kelley-Kerr Energy Corp. (Noranda Explor. Co. Ltd.)	Au	Assess	GL	1986	2.9328	
Moss Twp. (G-676), Powell Lake (G-549)	52B10/SW, 52B7/NW	101a. Kennco Explors. Canada Ltd. (Wawiag Resources Ltd.)	Au	Assess	Geochem, SA, GL	1985	2.8714	
Moss Twp. (G-676), Powell Lake (G-549)	52B10/SW, 52B7/NW	101b. Kennco Explors. Canada Ltd. (Gracey, K. A.)	Au	Assess	VLF, Mag	1985	2.8716	
Wabikoba Lake (G-620)	42C13/SW	102. Key Lake Explor. Ltd. (Brandy Brook Mines Ltd.) (Dillman, E.)	Au	Assess	Geochem, GL, VLF, Mag, SA	1986	2.9213	
Rickaby Twp. (G-161), Lapierre Twp. (G-65)	42E13/SE, 42E14/SW	103. Kidd Resources Ltd. (Dik Dik Property)	Au	Assess	VLF, Mag	1986	2.9177	
Tuuri Twp. (G-635)	42D15/SW	104. Kingdom Resources Ltd. (Steel Mountain Project)	Au, Cu, Zn	Assess	Geochem, SA	1985	2.8612	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Steeprock Lake (G-560)	52B13/SE	105. Klug, Fred (Wicheruk, Mitch)	Au	Assess	DD 1-56.41 m	1985	-	
Puddy Lake (G-118)	52H13/NE	106a. Kuhner, Knut	Os, Ir, Pt, Pd, Rh, Ru, Cu, Ni	Assess	Man Work	1985	-	
Puddy Lake (G-118)	52H13/NE	106b. Kuhner, Knut	Os, Ir, Pt, Pd, Rh, Ru, Cu, Ni	Assess	STr	1986	-	
Rich Lake (G-388)	52P9/SE	107. Labchuk, Mike	Au	Assess	VLF, Mag, SA, DD 1-45.8 m	1985	2.8779	
Hutchison Twp. (G-571)	52B14/SW	108. Labrador Mining & Explor. Co. Ltd. (Hill Property)	Au	Assess	SA	1985	2.8546	
Weaver Twp. (G-576)	52B14/SE	109. Lazan Explor. & Develops. Ltd. (Homestake-Pothole Lake Property)	Au	Assess	SA	1984	2.8531	
Lower Aguasabon Lake (G-599)	42D14/NE	110. Lazurus Resources Ltd.	Au	Assess	Geochem, GL, VLF, Mag, SA	1985	2.8761	
Summers Twp. (G-165), Maryjane Lake (G-80)	42E12/SW, 52H9/SE	111. Legion Resources Ltd. (Vantoi, B.)	Au	Assess	AEM, VLF	1986	2.9426	
McIntyre Twp. (G-674)	52A6/NE	112. Lenoir, Albert	Pb, Zn, Amy	Assess	Man Work	1985	-	
Priske Twp. (G-631), Killraine Twp. (G-625)	42D14/SW/SE	113. Lincoln Resources Inc. (GLE Resources Ltd.) (Schreiber Project)	Au, Ag, Cu, Zn	Assess	GL	1985	2.8561	
McBean Lake (G-321)	42E10/NE	114a. Long Lake Gold Ltd. (Malouf, M.)	Au	Assess	VLF, Mag	1986	2.9138	
McBean Lake (G-321)	42E10/NE	114b. Long Lake Gold Ltd. (Malouf, M.) (Long Lake Project)	Au	Assess	VLF, Mag	1986	2.9260	
Molson Lake (G-603)	42C12/NW	115. Lynx Canada Explor. Ltd.	Au	OMEP	PR, Geochem, IP	1983	63.4324	
Pic Twp. (G-630)	42D9/NW	116. Lytton Minerals Ltd. (Peekongay Property) (Ontario Paper Co. Ltd.)	Au	OMEP	Res, IP, DR, DD 30-7575 m, SA, SR, GL	1984	63.4462	
Pic Twp. (G-630)	42D9/NW	117a. Mac-Am Resources Corp. (MacKenzie Energy Corp. Property) (Noranda Explor. Co. Ltd.)	Au	Assess	Geochem, GL, SA	1985	2.8480	
Pic Twp. (G-630)	42D9/NW	117b. Mac-Am Resources Corp.	Au	Assess	DD 1-121.1 m	1986	-	
Strey Twp. (G-633), Lower Aguasabon Lake (G-599)	42D14/NE	117c. Mac-Am Resources Corp.	Au	Assess	Geochem, SA, GL	1985	2.8645	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake/ Wabikoba Lake (G-620)	42C12/NW	118a. Magenta Development Corp.	Au	Assess	STr	1986	-	
Molson Lake/ Wabikoba Lake (G-620)	42C12/NW	118b. Magenta Development Corp.	Au	Assess	HLEM	1986	2.9101	
Vincent Twp. (G-163)	42E12/NE	119. Maki, Neil R.	Au	Assess	Mech Work	1983	-	
Haines Twp. (G-662), Hagey Twp. (G-661)	52B9/NW	120. Maple Leaf Petroleum Ltd. (511735 Ontario Ltd.)	Au	Assess	Geochem, GL, SA	1985	2.8724	
Tuuri Twp. (G-635)	42D15/SW	121. Marathon Minerals Inc.	Au	OMEP	PR	1983	63.4312	
Lower Aguasabon Lake (G-599)	42D14/NE	122. Marge Enterprises Ltd.	Au	OMEP	PR	1983	63.4353	
McTavish Twp. (G-675)	52A10/NE	123a. Marino, Peter (Marino, John)	Amy	Assess	Man Work, STr	1986	-	
McTavish Twp. (G-675)	52A10/NE	123b. Marino, Peter (Marino, John)	Amy	Assess	Man Work, Mech Work, STr	1986	-	
Walsh Twp. (G-636)	42D15/SE	124. McCabe, Roland	Pb, Zn, Ag	Assess	Mech Work	1986	-	
Priske Twp. (G-631)	42D14/SE/ SW	125. Megalode Resources Inc.	Au	OMEP	GL	1984	63.4389	
Molson Lake/Lecours Twp. (G-2863)	42C12/NW	126. Melrose Resources Project (Noranda Explor. Co. Ltd.)	Au	Assess	DD 3-576.32 m	1986	-	
Irwin Twp. (G-164), Sandra Twp. (G-167), Walters Twp. (G-171)	42E12/NW	127a. Metalore Resources Ltd.	Au	Assess	AEM, VLF	1984	2.8043	
Irwin Twp. (G-164)	42E12/NW	127b. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 1-32.4 m	1984	-	
Irwin Twp. (G-164)	42E12/NW	127c. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 8-523.34 m	1984/85	-	
Irwin Twp. (G-164)	42E12/NW	127d. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	DD 12-1293.6 m	1985	-	
Irwin Twp. (G-164)	42E12/NW	127e. Metalore Resources Ltd. (Brookbank Prospect)	Au	Assess	CS	1986	-	
Walters Twp. (G-171)	42E12/NE	127f. Metalore Resources Ltd.	Au	Assess	GL, Mag	1985	2.8541	
Syine Twp. (G-634), Santoy Lake (G-612)	42D15/SW, 42D14/SE, 42D15/NW	128a. Micham Explor. Inc.	Au	Assess	Man Work, Mech Work	1983/84	-	
Syine Twp. (G-634), Santoy Lake (G-612)	42D15/SW, 42D14/SE, 42D15/NW	128b. Micham Explor. Inc. (Empress Mine) (Ursa Major Prop.) (Mocan Valley Property)	Au	OMEP	PR, Geophys, GL, SA	1983/84	63.4299	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Syine Twp. (G-634), Santoy Lake (G-612)	42D15/SW, 42D14/SE, 42D15/NW	128c. Micham Explor. Inc.	Au	OMEP	Geochem, IP, DD 4-587.32 m	1984	63.4395	
Walsh Twp. (G-636)	42D15/SE	129. Michano, D. A.	Au	Assess	Man Work, Mech Work	1985	-	
Wabikoba Lake (G-620)	42C13/SW	130. Mid Canada Explor. Services Ltd. (Core Energy Corp.)	Au	Assess	DD 2-235.31 m	1985	-	
Klotz Lake (G-295)	42F13/SW	131. Mid-North Engineering Services Ltd. (Transway Explor.)	Au	Assess	Geochem	1983/84	2.8134	
Norway Lake (G-545)	52G3/SW	132. Mining North Explor. Ltd.	Au, Ag, Cu, Pb, Zn	OMEP	SR, Geophys	1982	63.4157	
Pifher Twp./Tyrol Lake (G-141)	42E13/SW	133. Mitto/Maruska Group	Au	Assess	AEM, VLF, A Mag	1986	2.9470	
Weaver Twp. (G-576)	52B14/SE	134. Morehouse, W.	W, Pt, Pd, Cu, Ni	Assess	STr	1986	-	
Coughlan Lake (G-26)	42L4/SE	135. Muscocho Explors. Ltd.	Au, Ag, Cu	Assess	DD 1-114.3 m	1985	-	
Molson Lake (G-603)	42C12/NW	136. National Trust Co. Ltd. (Arctic Red Resources) (Michano Option)	Au	OMEP	DR, SA	1983	63.4480	
Hipel Twp./Lapierre Lake (G-65)	42E14/SW	137. Nelson, B. I.	Au	Assess	Mech Work, STr	1986	-	
Killraine Twp. (G-625)	42D14/NW	138. New Ambrose Resources Inc. (GLE Resources Ltd.)(Lincoln Resources Inc.)	Cu, Zn, Au, Ag	Assess	SA	1986	2.8917	
Killala Lake (G-596)	42E2/SE	139. New Insco Mines Ltd. (Prairie Lake Property)	Cb, Nb, Wo, P, U, Ta, RE	Assess	PR	1983	-	
Burchell Lake (G-706)	52B10/SE	140a. Noranda Explor. Co. Ltd. (Hicks Option)	Au	Assess	GL, VLF, Mag	1986	2.9372	
Conmee Twp. (G-647)	52A12/NE	140b. Noranda Explor. Co. Ltd. (Stewart Option)	Au	Assess	DD 5-1038.5 m, SA	1985	-	
Conmee Twp. (G-647)	52A12/SE	140c. Noranda Explor. Co. Ltd. (Stewart Option)	Au	Assess	VLF	1985	2.8484	
Conmee Twp. (G-647)	52A12/SE	140d. Noranda Explor. Co. Ltd.	Au	Assess	SA	1985	2.8704, 2.8705	
Conmee Twp. (G-647)	52A12/SE	140e. Noranda Explor. Co. Ltd. (Stewart Option)	Au	Assess	GL, IP, Mag	1985	2.8913	
Duckworth Twp. (G-638)	52B9/SE	140f. Noranda Explor. Co. Ltd. (Duckworth Property)	Au	Assess	AEM, VLF, A Mag	1985	2.8805	
Foch Lake (G-591), Roberta Twp. (G-632)	42F3/NW, 42F4/NE	140g. Noranda Explor. Co. Ltd. (Aquaris Resources Joint Venture-Project 1191)	Au	Assess	Geochem, GL, SA	1984/85/ 1986	2.9103	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Foxtrap Lake (G-592), Killala Lake (G-596), Vein Creek (G-618)	42D15/NE, 42E2/SE, 42E1/SW	140h. Noranda Explor. Co. Ltd.	Pt, Pd, Au	Assess	AEM, VLF	1985	2.8572	
Hilltop Lake (M-2874), Mountairy Lake (G-743)	52G16/NW/SW	140i. Noranda Explor. Co. Ltd.	Au	Assess	DD 4-445.21 m	1985	-	
Killraine Twp. (G-625)	42D14/NW	140j. Noranda Explor. Co. Ltd. (Wilson, A.) (Bond, J.) (Mocnik, D.)	Cu, Zn, Au, Ag	Assess	Man Work	1985	-	
Killraine Twp. (G-625)	42D14/NW	140k. Noranda Explor. Co. Ltd.	Cu, Zn, Au, Ag	Assess	GL, VLF	1986	2.9237	
Killraine Twp. (G-625)	42D14/SW	140l. Noranda Explor. Co. Ltd. (Victoria Lake Project)	Cu, Zn, Ag, Au	Assess	GL	1986	2.9454	
Laurie Twp. (G-669), Horne Twp. (G-664)	52A12/SW	140m. Noranda Explor. Co. Ltd. (Kukkee Option)	Au	Assess	GL, VLF, Mag	1985	2.8676	
Lecours Twp. (G-2863)	42D9/NE	140n. Noranda Explor. Co. Ltd. (Pryme South Project)	Au	Assess	SA	1985	2.8315	
Lecours Twp. (G-2863)	42D9/NE	140o. Noranda Explor. Co. Ltd. (Pryme South Property)	Au	Assess	Geochem	1984	2.8462	
Lecours Twp. (G-2863)	42D9/NE	140p. Noranda Explor. Co. Ltd. (Pryme South Joint Venture)	Au	Assess	GL, SA	1984	2.8464	
Richardson Lake (G-553)	52G3/SE	140q. Noranda Explor. Co. Ltd. (Richardson Lake Prop.)	Au	Assess	HLEM, Mag	1985	2.9164	
Roberta Twp. (G-632), Loken Lake (G-597)	42F4/NE	140r. Noranda Explor. Co. Ltd.	Bm	Assess	Mech Work, STr	1984	-	
Wabikoba Lake (G-620)	42C13/SW	140s. Noranda Explor. Co. Ltd. (Pryme North Joint Venture)	Au	Assess	Geochem, SA	1984	2.8558	
Wabikoba Lake (G-620)	42C13/SW	140t. Noranda Explor. Co. Ltd. (Pryme North Property)	Au	Assess	STr, Mech Work	1985	-	
Wabikoba Lake (G-620)	42C13/SW	140u. Noranda Explor. Co. Ltd. (Firetower Two Project)	Au	Assess	GL	1986	2.9329	
Loken Lake (G-597)	42F4/NE	141a. Noranda Inc. (Geco Div.)	Bm	Assess	DD 4-1540.46 m, SA	1984	-	
Loken Lake (G-597)	42F4/NE	141b. Noranda Inc. (Geco Div.)	Bm	Assess	DD 2-1373.6 m	1986	-	
Loken Lake (G-597)	42F4/NE	141c. Noranda Inc. (Geco Div.)	Bm	Assess	DD 2-403.6 m	1986	-	
Manitouwadge Lake (G-600)	42F4/NW	141d. Noranda Inc. (Geco Div.)	Bm	Assess	DD 1-303.33 m	1982	-	
Seeley Lake (G-613), Pic Twp. (G-630)	42D16/SW, 42D9/NW	141e. Noranda Inc. (Geco Div.) (Marathon North & South Properties)	Au	Assess	GL	1985	2.8708	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G-630)	42D9/NE	142. Narex Ore Search Cons. (Onitap Resources Inc.) (Gold Fields Canadian Mining Ltd.)	Au	Assess	DD 1-849.99 m	1986	-	
Wabikoba Lake (G-620)	42C13/SW	143. Norman Resources	Au	OMEP	PR	1984	63.4407	
Pifher Twp./Tyrol Lake (G-141)	42E13/SW	144a. Northern Concentrators Ltd. (Cowan, S.) (Crooked Green Property)	Au, Ag, Cu	OMEP	GL, DD 27-763.9 m	1983	63.4304	
Pifher Twp./Tyrol Lake (G-141)	42E13/SW	144b. Northern Concentrators Ltd. (Cowan Gold Prop.)	Au, Ag, Cu	Assess	CS	1985	2.8453	
Castlewood Lake (G-22)	42E13/NE	145. Northgate Explor. Ltd. (Castlewood Lake Project)	Au	Assess	GL, VLF, Mag	1985/86	2.9149, 2.9150	
Molson Lake/ Wabikoba Lake (G-620)	42C12/NW	146a. Novamin Inc.	Au	Assess	DD 1-74 m	1986	-	
Molson Lake/ Wabikoba Lake (G-620), Brothers Twp. (G-3172), Bomby Twp. (G-3173)	42C12/NW	146b. Novamin Inc. (Hemlo-Molson Lake Prop.)	Au	Assess	GL	1986	2.9332	
Summers Twp. (G-165)	42E12/NW	147. O'Hara Resources Ltd. (Antoniou, A.)	Au	Assess	Mag	1986	2.8975	
Elmhirst Twp. (G-162)	42E13/SE	148. 539376 Ontario Ltd.	Au	Assess	STr	1986	-	
Rickaby Twp. (G-161)	42E13/SE	149. Orofino Resources Ltd. (Atigogama Property)	Au	Assess	GL	1985	2.8403	
Pic Twp. (G-630)	42D9/NE	150. Padre Resources Ltd.	Au	OMEP	AEM, A Mag	1983/84	63.4303	
Kabamichigama Lake (G-58)	42E4/NE	151. Paterson, R.	Amy	Assess	Man Work, Mech Work	1985	-	
Duckworth Twp. (G-638)	52B9/SE	152. Penziwol, M. (Gold Creek Property)	Au	Assess	VLF, Mag	1985	2.8892	
Puddy Lake (G-118)	52H13/NE	153. Platinum Explor. Can. Inc. (Puddy Lake Prop.)	Cu, Ni, PGE	Assess	Geochem	1986	2.9337	
Linklater Lake (G-69)	52I10/SW	154. Plumridge, D.	Au	Assess	Mech Work	1985	-	
Irwin Twp. (G-164)	42E12/NW	155. Prago Resources & Energy Inc.	Au	OMEP	GL	1984	63.4416	
Veekay Lake (G-440)	42M12/SE	156. Pricemore Resources Inc.	Au	Assess	CS	1982	-	
Mussy Lake (M-29), Pic Twp. (G-630), Lecours Twp. (G-2863)	42D9/SE/ NE	157. Pryme Energy (Noranda Explor. Co. Ltd.)	Au	Assess	GL	1984/85/ 1986	2.8463	
Toronto Lake (G-140)	42L5/SW	158a. Quebec Cobalt & Explor. Ltd. (Toronto Lake Claims)	Au	Assess	VLF	1986	2.9083	
Toronto Lake (G-140)	42L5/SW	158b. Quebec Cobalt & Explor. Ltd. (Toronto Lake Claims)	Au	Assess	Geochem, SA	1984	2.9118	
Toronto Lake (G-140)	42L5/SW	158c. Quebec Cobalt & Explor. Ltd. (Toronto Lake Project)	Au	Assess	VLF	1985	2.9119	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wabikoba Lake (G-620)	42C13/SW	159. Qued Resources Ltd. (Musher Lake Property) (Manwa Explor. Service)	Au	OMEP	Geochem, GL	1983	63.4318	
Rous Lake (G-611)	42D9/NE	160. Rabbit Oil & Gas Ltd.	Au	OMEP	Geochem, GL	1984	63.4410	
Gorham Twp. (G-660)	52A11/SW	161a. Redden, J. W.	Au	Assess	Rad	1985	2.8697	
Gorham Twp. (G-660)	52A11/SW	161b. Redden, J. W.	Au	Assess	SA	1985	2.8815	
Gorham Twp. (G-660)	52A11/SW	161c. Redden, J. W.	Au	Assess	STr	1985	-	
Rich Lake (G-388)	52P9/SE	162. Reid, James	Au	Assess	DD 1-45.8 m, SA	1985	-	
Lower Aguasabon Lake (G-599)	42D14/NE	163. Rich Resources Ltd.	Au	Assess	Geochem, GL, VLF, Mag, SA	1985	2.8731	
Pic Twp. (G-630)	42D9/NE	164. Rideau Resources Ltd.	Au	OMEP	PR	1982	63.4377	
Rous Lake/Molson Lake (G-611)	42D9/NE, 42C12/NW	165. Ripple Resources Ltd.	Au	OMEP	IP	1983	63.4307	
Oboshkegan Twp. (G-173)	42L4/NE	166a. Roach, S. N. (Knucklethumb Lake Prop.)	Au, Ag, Zn, Cu	Assess	Mag	1984	2.8940	
Oboshkegan Twp. (G-173)	42L4/NE	166b. Roach, S. N. (Knucklethumb Lake Prop.)	Au, Ag, Zn	OMEP	VLF	1984	63.4426	
Pic Twp. (G-630)	42D9/NW	167. Rolls Resources Ltd. (539258 Ontario Ltd.)	Au	Assess	Res, GL, IP	1985	2.8436	
Molson Lake/Brothers Twp. (G-3172)	42C12/NW	168. Rose Resource Corp. (Petrostates Resource Corp.)	Au	Assess	DD 1-824.79 m	1985	-	
Rickaby Twp. (G-161)	42E13/SE	169a. Rosenblatt, A. (Kenty Showing)	Au, Ag, Pb, Zn, Cu	Assess	VLF	1985	2.8905	
Rickaby Twp. (G-161)	42E13/SE	169b. Rosenblatt, A.	Au	Assess	STr	1985	-	
Errington Twp. (G-479)	42E11/NE	170. Roxmark Mines (Magnet Mine Property)	Au	OMEP	PR, GL, SA, UG/DD 14-1983 m	1983/84	63.4409	
Empire Lake (G-718)	52G9/NE	171. St. Joe Canada Inc. (Martinson, F.) (Empire Lake Property)	PGE	Assess	DD 6-880.7 m	1985	-	
Scoble Twp. (G-687)	52A5/SE	172. Salmon, Mark P. (Salmon Prop.)	Ag	OMEP	Res, Geochem, VLF, Mag, SA	1984	63.4449	
Sawbill Bay (G-558)	52B14/NW	173a. Sande, D. J.	Au	Assess	Man Work, Mech Work	1985	-	
Sawbill Bay (G-558)	52B14/NW	173b. Sande, D. J.	Au	Assess	SA	1985	2.9156, 2.9157	
Burchell Lake (G-706)	52B10/SE	174a. Sanders-Lukosius, J.	Au	Assess	VLF	1985	2.9313	
Burchell Lake (G-706)	52B10/SE	174b. Sanders-Lukosius, J.	Au	Assess	VLF	1986	2.9312	
Burchell Lake (G-706)	52B10/SE	175a. Sanders, T.	Au	Assess	VLF	1986	2.9311	
Burchell Lake (G-706)	52B10/SE	175b. Sanders, T. (Sanders-Lukosius, J.)	Au	Assess	GL	1986	2.9314	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Gzowski Twp. (G-182)	42L5/SE	176. Sanfacon, Leon	Au	Assess	Mech Work	1986	-	
Priske Twp. (G-631), Strey Twp. (G-633)	42D14/SE	177. Schreiber Resources Ltd. (Hoiles, H.) (Hays Lake Property)	Au	Assess	Geochem, GL, SA	1985	2.9159	
Powell Lake (G-549)	52B7/NW	178a. Shebandowan Resources Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	Geochem, GL, SA	1985	2.9063	
Powell Lake (G-549)	52B7/NW	178b. Shebandowan Resources Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	Mech Work	1986	-	
Wabikoba Lake (G-620)	42C13/SW	179. Shediac Bay Resources Inc. (Valley Lake Property)	Au	Assess	Geochem, GL, VLF, Mag, SA	1985	2.9010	
Tib Lake (M-2911)	52H4/NW	180a. Sheridan, J. P.	Pt, Pd Cu, Ni	Assess	STr	1986	-	
Tib Lake (M-2911)	52H4/NW	180b. Sheridan, J. P.	Cu, Ni, Pt, Pd	Assess	STr	1986	-	
Oboshkegan Twp. (G-173)	42L4/NE	181. Sherritt Gordon Mines Ltd.	Au	Assess	Geochem, GL, SA	1984/85	2.8514	
Ashmore Twp. (G-472)	42E10/NW	182. Shields, S. (Roche Long Lac Prospect)	Au	Assess	Man Work, Mech Work	1986	-	
Wabikoba Lake (G-620)	42C13/SW	183a. Shiningtree Gold Resources Inc. (Eden Roc Mineral Corp.)	Au	OMEP	PR	1983	63.4354	
Wabikoba Lake (G-620)	42C13/SW	183b. Shiningtree Gold Resources Inc.	Au	Assess	STr	1985	-	
Pic Twp. (G-630)	42D9/NW	184. Shoila Resources Ltd.	Au	Assess	GL, VLF	1985	2.8755	
O'Neil Twp./Seeley Lake (G-613)	42D16/SW	185a. Shunock, M. (O'Neil Twp. Property)	Au	Assess	Mag	1986	2.9001	
Seeley Lake (G-613)	42D16/SW	185b. Shunock, M.	Au	Assess	Mag	1985	2.8886	
Pic Twp. (G-630)	42D9/NW	186. Silver Standard Mines Ltd. (Kusserow-Nabigon Option)	Au	Assess	Man Work, Mech Work	1986	-	
Goldie Twp. (G-658)	52A12/NW	187a. Skalesky, P. (Peterson, W.) (Peterson, T.)	fel	Assess	Man Work, Mech Work	1985	-	
Priske Twp. (G-631)	42D14/SW	187b. Skalesky, P.	Au	Assess	Mech Work	1985	-	
Priske Twp. (G-631)	42D14/SW	187c. Skalesky, P.	Au	Assess	Mech Work	1986	-	
Rous Lake (G-611)	42D9/NE	188. Southern Union Resources Inc.	Au	OMEP	IP	1983	63.4285	
Dickison Lake (G-31)	42E3/NW	189. Sperle, Kasper (Hibbart, N.)	Au, Ag	Assess	AEM, A Mag	1986	2.9262	
Schwenger Twp. (G-574)	52B13/SE	190. Steep Rock Resources Inc.	Au	Assess	SA	1984	2.8483	
Sawbill Bay (G-558)	52B14/NW	191a. Stewart, E. J.	Au	Assess	SA	1985	2.9158	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Sawbill Bay (G-558)	52B14/NW	191b. Stewart, E. J.	Au	Assess	Mech Work, Man Work	1985	-	
Walsh Twp. (G-636)	42D15/SE	192. Stralak Resources Inc.	Pb, Zn, Ag	Assess	STr	1986	-	
Dorothea Twp. (G-116), Sandra Twp. (G-167)	52H9/NE	193a. Stroud Resources Ltd. (Tyson Option) (Bish Bay Project)	Au, Mo	OMEP	PR, Tr, GL, SA	1983	63.4321	
McComber Twp. (G-166), Vincent Twp. (G-163)	42E12/NW/NE	193b. Stroud Resources Ltd. (Maki Option)	Au	OMEP	PR	1983	63.4321	
Tyrol Lake (G-141)	42E13/SW	194a. Sweany Syndicate (Thorsteinson, D.) (Cox, N.) (Lassila, P.)	Au, Ag, Pb, Zn, Cu	Assess	Geochem, GL, VLF, SA	1986	2.8958	
Tyrol Lake/Pifher Twp. (G-141), Meader Twp. (G-168), Sandra Twp. (G-167), Irwin Twp. (G-164)	42E13/SW, 42E12/NW	194b. Sweany Syndicate	Au, Ag, Pb, Zn, Cu	Assess	AEM, VLF, A Mag	1986	2.9393	
Lecours Twp. (G-2863)	42D9/NE	195a. Tandem Resources Ltd. (Stanmar Resources Ltd.)	Au	OMEP	Geochem, Mag	1984	63.4359	
Moss Twp. (G-676)	52B10/SE	195b. Tandem Resources Ltd. (Hawkins, S. G.)	Au	Assess	VLF, Mag	1986	2.9097	
Pic Twp. (G-630)	42D9/NW	196. Tara Hills Gold Resources Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	GL	1985	2.8603	
Coughlan Lake (G-26)	42L4/SE	197. Tashota Nipigon Mines Ltd.	Au, Ag, Cu	OMEP	GL, EM, SA, DD 7-680.01 m	1983	63.4334	
Metcalfe Lake (G-84)	42L4/NE	198. Teck Explors. Ltd. (Tashota Prop.)	Au	Assess	DD 3-297.70 m	1984	-	
Seeley Lake (G-613)	42D16/SW	199. Teeshin Resources Ltd.	Au	OMEP	GL	1984	63.4422	
McComber Twp. (G-166), Vincent Twp. (G-163)	42E12/NW/SW/SE/NE	200. Tenacity Mining Corp. (Craskie Mines Ltd.)	Au	Assess	AEM, VLF. A Mag	1985	2.8783	
McTavish Twp. (G-675)	52A10/NE	201. Ternowesky, J.	Amy	Assess	STr, Mech Work	1984/85	-	
Burchell Lake (G-706)	52B10/SE	202a. Thew, Roger	Au	Assess	STr	1984	-	
Burchell Lake (G-706)	52B10/SE	202b. Thew, Roger	Au	Assess	Mech Work, STr	1985	-	
Castlewood Lake (G-22), Coughlan Lake (G-26)	42E13/NE, 42L4/SE	203. Thorco Gold Finders Ltd. (Cox, N.) (Thorsteinson, D.)	Ag, Au, Pb, Cu	Assess	Mech Work, Gr, Tr, GL, IP, SP	1985/86	2.9134	
Summers Twp. (G-165)	42E12/SW	204a. Thorsteinson, D. (Summers Property)	Au	Assess	DD 1-79.76 m	1984	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Summers Twp. (G-165)	42E12/SW	204b. Thorsteinson, D.	Au	Assess	VLF	1985	2.8851	
Errington Twp. (G-479)	42E11/NE	205. Thorwald, J.	Au	Assess	DD 1-33.78 m, SA	1986	-	
Klotz Lake (G-295)	42F13/SW	206a. Transway Explors. Ltd.	Au	OMEP	GL	1984	63.4350	
Klotz Lake (G-295)	42F13/SW	206b. Transway Explors. Ltd. (Mid-North Engineering Services Ltd.)	Au	Assess	DD 2-244 m, SA	1984	-	
Pic Twp. (G-630), Leocurs Twp. (G-2863)	42D9/NE	207. Tri-Star Resources Ltd.	Au	Assess	SA, VLF	1985	2.8594	
Cockeram Twp. (G-184)	52H2/SE	208a. Tri-Ven Minerals Corp.	$\mathrm{CaCo_3}$, marl	Assess	Mech Work	1985	-	
Cockeram Twp. (G-184)	52H2/SE	208b. Tri-Ven Minerals Corp.	$\mathrm{CaCo_3}$, marl	Assess	Man Work	1986	-	
Rous Lake/Lecours Twp. (G-611)(G-2863)	42D9/NE	209. Tuscaloosa Oil & Gas Inc. (Gold Fields Canadian Mining Ltd.)	Au	Assess	DD 1-913.19 m	1986	-	
White Lake (N) (G-622)	42C13/SE	210. Tylox Resources Corp.	Au	Assess	DD 2-311 m	1985	-	
Priske Twp. (G-631)	42D14/SE/SW	211. United Continental Energy Corp. (Livingstone Energy Corp.)	Au	OMEP	GL, SA	1983	63.4384	
White Lake (H) (G-622)	42C13/SE	212. Ventora Resources Ltd.	Au	OMEP	Geochem, GL, SA	1983	63.4397	
Tuuri Twp. (G-635)	42D15/SW	213. Wasabi Resources Ltd. (Chavin of Canada Ltd.)	Au	OMEP	GL, SA	1983	63.4382	
Burchell Lake (G-706)	52B10/SE	214a. Wawiag Resources Inc. (Grouse Lake Prop.)	Au	Assess	Tr, SA	1984	2.8745	
Burchell Lake (G-706)	52B10/SE	214b. Wawiag Resources Inc. (Grouse Lake Property)	Au	Assess	Mech Work	1984	-	
Powell Lake (G-549)	52B7/NW	214c. Wawiag Resources Inc.	Au	OMEP	PR	1984	63.4369	
Bartman Lake (G-202)	43D12/SE	215. Weaco Resources Ltd.	Au, Ag, Cu, Pb, Zn	Assess	AEM, VLF, A Mag	1985	2.9007	
Irwin Twp. (G-164), Sandra Twp. (G-167), Dorothea Twp. (G-116), Walters Twp. (G-171)	42E12/NW, 52H9/NE, 42E12/NE	216a. Wescap Energy Corp.	Au	Assess	AEM, VLF, A Mag	1985	2.8838	
Irwin Twp. (G-164)	42E12/NW	216b. Wescap Energy Corp. (Cowan, M. F.)	Au	Assess	AEM, VLF, A Mag	1985	2.8938	
Seeley Lake (G-613)	42D16/SW	217. Westam Oil Ltd. (Ventex Energy Ltd.)	Au	OMEP	IP	1983	63.4347	
Pic Twp. (G-630)	42D9/NW	218. Wildcat Petroleum Ltd.	Au	OMEP	IP, Res	1983	63.4373	
Rous Lake (G-611)	42D9/NE	219a. Youngman Oil & Gas Ltd. (Gold Fields Canadian Mining Ltd.) (Kohn, S.)	Au	OMEP	IP	1983	63.4387	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake (G-611)	42D9/NE	219b. Youngman Oil & Gas Ltd.	Au	OMEP	Geochem, GL	1984	63.4410	
Pays Plat Lake (G-606)	42D14/NW	220. Zahavy Mines Ltd.	Cu, Zn, Ag, Au	Assess	DD 1-265.03 m	1985	-	
Hanson Lake (G-47)	52H1/NE	221. Zayachkivsky, B. (Kissin, S.) (Griffith, T.) (MNW Property)	Li, Ta	Assess	GL	1986	2.9427	
Pic Twp. (G630)	42D9/NE	222. Zenco Resources Inc. (Gold Fields Canadian Mining Ltd.)	Au	Assess	DD 1-971.10 m	1986	-	

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 4.2

Individual or Company	Activity
Acker, W.	Bulk sampling in Schreiber Township
Andaurex Resources Incorporated	Geology, airborne geophysics, and drilling in the Onaman Lake Area
Anglo-Canadian Mining Corporation	Diamond drilling in Pifher Township
Canadian Gold Resources Incorporated	Airborne geophysics and drilling in Rickaby, Walters, Leduc, Irwin, and Lapierre Townships
Lac Minerals	Geology and sampling in Errington Township
Lincoln Resources Limited	Diamond drilling, and geophysics in Priske Township
Matt Berry Mines Limited	Land acquisition in Moss Township
Muscocho Explorations Limited - Tashota Nipigon Mines Limited	Diamond drilling in the Onaman Lake Area
Oja R., Wicheruk, M., Chapman, S.	Stripping, trenching, and sampling in the Sapawe Lake Area
Orevco Incorporated	Stripping, sampling, and geology in Summers Township
Parquet Resources Incorporated	Linecutting,drilling in Sandra-Meader Townships
Phoenix Gold Mines Limited	Stripping, trenching, sampling, and geology in Irwin, Pifher, Walters, and Elmhirst Townships
Pronto Explorations Limited	Diamond drilling in Walters-Leduc Townships
Royal Oak Resources	Linecutting, geology, and geophysics in Fulford Township
Zenmac Mines Limited	Mineral exploration in the Winston Lake Area

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 4.3

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1976	2,364	3,552	6,079	52,551.6	29,504	4,600	101,025.8
1977	1,964	2,966	5,077	24,879	25,601	4,870	68,727
1978	3,517	1,982	6,612	20,182	20,589	6,206	51,299
1979	3,099	2,139	7,554	11,528	69,612	14,727	101,799
1980	5,527	1,836	11,245	53,418	57,483	5,372	127,288
1981	6,768	4,162	13,851	55,256	172,366	13,863	256,686
1982	10,266	4,613	19,349	133,035	114,805	24,437	292,273
1983	15,835	1,537	33,547	113,554.3	439,992.8	64,789.1	664,891.3
1984	8,389	7,206	34,904	142,488.6	551,863.9	90,107.6	922,977.6
1985	4,353	10,222	29,035	170,022.8	475,736.7	65,802.1	794,099
1986 (to end of Oct.)	13,163	12,776	29,440	100,768.9	175,247	21,718.7	339,998.6

Hole ILI was collared 450 m north of the Page-Williams Mine-Goliath Gold Mines Limited common boundary. The "Hemlo horizon" was intersected at 2349.8 m. Only a minor amount of molybdenite was noted.

Hole ILII was collared 400 m north of the Golden Sceptre Resources Limited Property—Page-Williams Mine claim block common boundary. A series of gold-bearing intersections occur within a silicified felsic to intermediate metavolcanic. Barite and molybdenite are associated with the zone. Intersections include 4.5 m of 0.107 ounce gold per ton and 3.1 m of 0.182 ounce gold per ton. A wedged hole was taken from ILII and intersected 33.5 m of 0.057 ounce gold per ton.

GOLD IN THE ATIKOKAN AREA

INTRODUCTION

Recent Precambrian mapping projects (Fumerton 1985, 1986; Stone *et al.* 1986) and geochronological studies (Thurston and Davis 1985; Davis and Jackson 1985) have considerably modified the existing interpretation of the geology of the Atikokan area.

GENERAL GEOLOGY AND STRUCTURE

In the Atikokan area there are three distinct terrains: 1) the Basement Complex; 2) the Atikokan Greenstone Belt, a part of the Wabigoon Subprovince; and 3) the Quetico-Seine Metasediments.

1. The Basement Complex

The Basement Complex consists of the Finlayson Lake Belt, the Lumby Lake Belt, and the Marmion Lake gneissic rocks. Uranium-lead dates from zircons by Davis and Jackson (1985) returned ages of 2999 Ma. Thurston and Davis (1985) refer to this group as the Wabigoon Diapiric Axis-Basement Complex. Rocks belonging to the Atikokan Greenstone Belt are unconformably deposited on this complex (D. Stone, geologist, Atomic Energy of Canada Limited, Ottawa, personal communication, 1985). The unconformity is exposed in the Steep Rock Mine pit.

2. The Atikokan Greenstone Belt

The supracrustal rocks of the Atikokan Greenstone Belt consists of felsic to ultramafic metavolcanics and metasediments. These rocks, along with the Basement Complex, have been intruded by felsic stocks such as the Dashwa Lake Stock.

Geochronological studies on the rocks within the Wabigoon Subprovince have shown ages from 2755 to 2695 Ma (Davis *et al.* 1982; Blackburn *et al.* 1985). No precise dating has been done on the supracrustal rocks in the immediate Atikokan area.

3. The Quetico-Seine Metasediments

The contacts between the Quetico Metasediments (predominantly a wacke-mudstone series) and the Seine Metasediments (polymictic conglomerates sandstone and mudstone) are fault bounded in the Atikokan area. It has been suggested that the Seine Metasediments are proximal facies of the more distal Quetico Metasediments (Wood 1980). Late felsic to ultramafic bodies intrude them.

The structural geology of the area is complicated and not clearly understood. Work by Borradaile (1982) in the Calm Lake area shows different styles of folding in the Quetico metasediments and the Atikokan Greenstone Belt. Work by Stone *et al.* (1986) shows the presence of a number of deformation zones. However, Stone *et al.* (1986) do not feel the Quetico Fault is present in the Atikokan area as a discrete fault. This is in contrast to Fumerton (1985, 1986) who suggests that the Quetico Fault separates the Atikokan Greenstone Belt and the Quetico Metasediments. Stone *et al.* (1986) stated that the deformation zones within the older Basement Complex, such as the Marmion Lake Batholith, do not extend into the Atikokan Greenstone Belt.

STYLES OF GOLD MINERALIZATION

The modified geological framework of the Atikokan area, together with new ideas on gold mineralization as per Colvine *et al.* (1984), suggests that there should be further modifications to the classification of gold mineralization as proposed by Wilkinson (1982) and modified by Schnieders and Dutka (1985).

Wilkinson (1982) outlined three general types of gold mineralization concentrated in quartz and quartz-carbonate veins: Marmion Lake Batholith Type; Contact Zone Type; and Metavolcanic-Hosted Stratabound Type. Recent studies have led to a modified classification with four proposed styles of gold mineralization, each with a distinct structural setting.

1. Vein Systems Within Ductile Shear Zones (Al_3O_8Occurrence)

Many of the veins described by Wilkinson (1982) as Marmion Lake Batholith Type veins belong to this class. The Al_3O_8 occurrence located in the south-central portion of Ramsay-Wright Township, is an example. The vein occurs within a ductile shear zone, 300 m wide, trending 050°, in the Marmion Lake tonalite intrusion. Tonalitic rocks outside of the shear zone consist of massive, equigranular rock composed of 80 percent white plagioclase, 15 percent quartz, and 5 percent amphibole and biotite. As the core of the shear zone is approached the tonalite is highly foliated and locally sericitic with the quartz phenocrysts stretched and flattened in the foliation. Near the Al_3O_8 occurrence the foliated tonalite is altered to a sericite-carbonate schist (locally containing a green mica) which is intruded by quartz veins. These quartz veins appear to have been further deformed, reducing the vein to a series of boudinaged lenses. A late mafic dike cuts the zone. Nahanni Mines Limited, drilling in the vicinity of the Al_3O_8 occurrence, intersected 6 feet (1.8 m) of 0.46 ounce gold per ton in drill hole RW-10 (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

The sequence of events described above can be summarized as follows: formation of a ductile shear zone, later alteration and formation of sericite-carbonate schist, quartz veining, further deformation, and boudinage of the quartz veins.

This suggests that many of the previously described northeast-trending lineaments in the Atikokan area are fault zones. D. Stone *et al.* (1986) have mapped the location of these deformation zones.

2. Vein Systems Controlled by Inhomogeneities in the Marmion Lake Batholith (Hammond Reef Mine)

This can be considered a subtype of Wilkinson's (1982) Marmion Lake Batholith Type. A number of the vein systems are controlled by the location of dikes within the Marmion Lake Batholith. On the Hammond Reef Property, located on the eastern side of Sawbill Bay, Marmion Lake, a northeastern lineament, splays into two subparallel branches. Recent trenching by Falconbridge Limited has exposed a vein system between the branches of the splay. The veins range up to 500 m in length and I m in width. A system of mafic dikes, locally altered to chlorite-carbonate schist, appear to control the placement of the vein system. The dikes strike 130° /20°S and are 1 to 3 m wide.

Other inhomogeneities such as the contact between gneissic and massive portions of the Marmion Lake Batholith can control the position of deformation.

3. Margins Of Stocks (Hill Lake Occurrences)

A number of occurrences are found at the contact between granitic bodies and supracrustal rocks. The Hill Lake occurrences are located in the central portion of Hutchinson Township, 26 km east of Atikokan. Recent stripping on the main Hill Occurrence has exposed a deformation zone, 10 to 40 m wide, trending 110° at the contact between tonalites to the north and mafic metavolcanics to the south. This contact zone consists of sericitic schist (deformed tonalite) and chlorite-carbonate schist (deformed mafic metavolcanics). Locally, within the chlorite-carbonate schist there are bands of sericitic schist up to 2 m wide that may have developed from a more felsic protogene. Quartz veins, up to 1 m wide, have been intruded into the contact zone. Mineralization in the veins consists of pyrite, chalcopyrite, and galena. Later deformation has boudinaged the veins into lens and pods, 20 to 30 m long. Locally, the quartz veins are brecciated and cemented by black tourmaline and arsenopyrite. Tourmaline also occurs in fractures which cut the foliated tonalite several hundred metres north of the contact zone. Late quartz-carbonate veining cuts the tourmaline rich breccia. In 1982, drillhole H-82-4 put down by Camflo Mines Limited intersected 0.39 m grading 1.28 ounce gold per ton (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

4. Carbonate-Rich Shear Zones Within Mafic Metavolcanics

A large number of carbonate-quartz rich shear zones cut the mafic metavolcanics. Gold mineralization is associated with these zones on a number of properties. Previous workers, including Wilkinson (1982), suggest that the carbonate zones are primary chemical metasediments. More recent work by Schnieders and Dutka (1985) suggests that the carbonate is a result of alteration associated with a shearing event.

The Mayflower Prospect is located 2.5 km west of Flanders Station on the Canadian National Railway. The general geology consists of mafic metavolcanics intruded by a tonalite body (150 by 320 m in size). The "Quetico Fault" (Fumerton 1986) is located 500 m to the south of the intrusion. An intense zone of carbonate alteration is associated with the margins of the tonalite. The carbonate alters both the tonalite and the mafic metavolcanics. Associated with the alteration is intense shearing. A quartz stock work is developed within the carbonate alteration zone. At least two generations of quartz are present: white glassy barren quartz and dark smokey quartz with gold mineralization. A similar pattern of mineralization occurs on the Kroocmo Property (*see* description this volume).

GUIDES TO EXPLORATION

The reinterpretation of the regional geology, together with new models on the style of gold mineralization, suggest the following guides to exploration:

1. Mapping by both Stone *et al.* (1986) and Fumerton (1985, 1986) has delineated a number of deformation zones. Colvine *et al.* (1984) and Poulsen (1984) suggest that splays or the intersections of deformation zones cause dilation and produce potential conduits for gold mineralization. Areas that should be examined include;
    - i) in the Harold Lake area, the Ear Lake Fault, and Rawn Lake Fault intersection (Fumerton 1985)
    - ii) at Perch Lake, the Rawn Lake and the Quetico Fault intersection (Fumerton 1985)
    - iii) a deformation zone on the western side of Marmion Lake which shows a number of branches (Stone *et al.* 1986)
2. Within lineaments or fault zones a number of features which concentrate deformation are:
    - i) dikes or variations of lithology within the Marmion Lake Batholith. A number of properties, such as the Hammond Reef Property, have vein systems associated with dikes. Prospecting should concentrate on areas with dikes or phase changes within the tonalite
    - ii) the margin of the Marmion Lake Batholith which focus deformation. A number of known occurrences, such as Hill Lake Occurrence, have been explored. Little prospecting has been done in the area east of Hill Lake
    - iii) within the Quetico Fault zone, small intrusions which are strongly altered and deformed. Gold is known to be associated with the tonalite intrusion on the Mayflower Property. Several other tonalite bodies within the Quetico Fault zone were noted by Fumerton (1985). These should be prospected for similar styles of mineralization.

EXPLORATION ACTIVITY IN THE ATIKOKAN AREA

Falconbridge Limited has extended their claim block around the Hammond Reef-Sawbill Property to cover the old Kabascong Mine area.

The Lynx Head Narrows Property or Bates Occurrence on Marmion Lake has been stripped and trenched.

The Fern Elizabeth Gold Explorations Limited Property has been optioned to Mimiska Exploration Limited. A program of linecutting, mapping, stripping, and geophysics has been initiated.

Interquest Resources Limited has drilled 13 holes (1500 m) on the Anjamin or J.J. Walsh Prospect just north of Sapawe Lake.

D. Kroocmo and B. Murray have done stripping and trenching on their property west of Calm Lake.

M. Wicheruk has stripped, trenched, and channel sampled the Mammoth Occurrence.

FORT HOPE AREA

INTRODUCTION

The recent gold discoveries near Pickle Lake have resulted in renewed activity in the Fort Hope area. Exploration in the area started in the 1920s with the discovery and operation of the Fort Hope Gold Mine on the southern side of Rond Lake (Wallace 1978). Activity was renewed in the 1960s with the discovery of gold in the Reserve Lake area, Fort Hope Indian Reserve. In 1963, the Zulapa Prospect on the northern shore of Reserve Lake was estimated to have reserves of 300 000 tons at 0.28 ounce gold per ton (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay, Ontario).

There are three basic associations of gold in these deposits; gold-antimony veins within shear zones, (Howells Lake); gold in arsenopyrite-rich iron formations (Goss Lake Occurrences); and gold-tungsten veins in shear zones hosting auriferous pyrite-pyrrhotite (Reserve Creek Occurrences).

RESERVE CREEK OCCURRENCE

The property is located east of the Fort Hope Indian Reserve, 5 km north of Eabamet Lake on Reserve Creek. Five mineral occurrences were first tested in the 1940s by Dome Exploration Limited. Further work was conducted by Lun Echo Gold Mines in 1961 and 1962. In 1980, Pricemore Resources Limited (currently First China Investments Limited) started an exploratory program. This program included linecutting, geophysics, and diamond drilling.

The general geology consists of an west-trending granitic sill (500 m wide) intruding intermediate to mafic metavolcanics (Prest 1939).

The Dome's A, B, and C Zones or "The Williamson Zone" occurs just north of Reserve Creek on claim TB582448. Zone "A" is exposed in a series of trenches and outcrops and consists of massive to pillowed mafic metavolcanics in the north becoming strongly foliated to sheared to the south. The moderately to strongly foliated metavolcanic consists of a chlorite schist with 1 to 3 mm porphyroblasts of magnetite. A magnetic anomaly follows the trend of mineralized unit for 600 m (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

In the "A" Zone, the magnetite is replaced by pyrite and pyrrhotite. Quartz stringers are boudinaged and deformed, making up less than 10 percent of the mineralized zone. Drill core suggests that the unit is folded; foliation changes from 090° to core axis to 020° to core axis. A sample of quartz vein assayed 1500 ppb gold, pyrite-pyrrhotite chlorite schist assayed 0.45 ounce gold per ton and magnetite chlorite schist assayed 6 ppb gold, (Ontario Geoscience Laboratory, Ontario Ministry of Northern Development and Mines, Toronto, Ontario). Diamond-drill hole results indicate the zone has a true width of 13 m. Drill results, by Pricemore Resources Limited, include 0.1245 ounce gold per ton across 74.6 feet (Hole 1-82) and 0.1256 ounce gold per ton across 73.0 feet (Hole 4-82) (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

THE GOSS LAKE OCCURRENCE

The property is located on the southern side of Goss Lake, 2 km northern of Mezhisk Lake and 19 km west of Fort Hope. Mineralization was discovered on the property in the 1940s by Conwest Exploration Company Limited. Approximately 15 000 feet of diamond drilling was carried out from 1940 to 1946 (this data was recently donated to the Assessment Files, Thunder Bay). More recently, Keezic Resources Limited carried out a program of linecutting, geophysics, geochemistry, and diamond drilling.

The geology of the Goss Lake Occurrence consists of amphibolite grade metasediments (wackes and iron formations). The wackes are thinly bedded, occasionally graded, with individual beds ranging from 1 to 5 cm in width. The iron formations have been metamorphosed to amphibole schist. Locally large garnets up to 2 cm are developed. The iron formation contains alternating layers of amphibole-garnet and cherty beds ranging from 1 to 10 cm in width. It is complexly folded with a pronounced thickening of units at the fold noses and two cleavages are developed. Two individual iron formations (up to 3 m wide) are known on the property, (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

The mineralization, which consists of pyrrhotite, arsenopyrite, and visible gold, is confined to the iron formation and quartz filled tension fractures within the iron formation. The pyrrhotite occurs as disseminations in layers up to 2 cm wide, usually parallel to foliation. Arsenopyrite is found as porphyroblasts up to 1 cm in size, most commonly in amphibole rich layers. Visible gold was observed in the quartz filled tension fractures. These fractures are often rimmed by a halo of amphibole. According to a 1981 unpublished consultants report for Keezic Resources Limited (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay):

> Two gold zones were indicated, one of which has a total length of 900 feet of separated shoots which average 0.25 ounces gold per ton across a width of 6.2 feet. The other zone has an

indicated total length of 400 feet averaging 0.394 ounces gold per ton across 5.0 feet.

In polished section gold was also noted as inclusions in the sulphide mineralization and gangue. Recently, a tonnage of 300 000 tons at 0.22 ounce gold per ton to 200 feet was announced (The Northern Miner, November 3, 1986, p.15).

THE HOWELLS (HOWARDS) LAKE OCCURRENCES

The Howells Lake group of occurrences are located 45 km west of Fort Hope. The first mineralization noted in the area was pyrite-stibnite rich float (Howells Lake Occurrence) on a small island in Howells Lake (Prest 1939). A number of old trenches are located on the northern side of the Albany River 3 km west of Howells Lake (Albany River Occurrences) and 1 km east of the northern end of Howells Lake (Thompson Occurrence). Drilling (257 m) was done on the Thompson Occurrence in 1951. The Howells Lake Occurrence was drilled in 1971 by Conwest Exploration Limited. In the late 1970s and early 1980s, the area was held by New Jersey Zinc Exploration Company (Canada) Limited. New Jersey Zinc carried out an extensive program of linecutting, geological mapping, geophysics, and diamond drilling on a number of these occurrences including the newly discovered Howells Lake Antimony Zone. The property was then optioned by Felmont Oil and Gas.

A merger between Homestake Mining Company and Felmont Oil and Gas resulted in Homestake Mineral Development Company (the Canadian subsidiary of Homestake Mining Company) acquiring the property. Homestake Mineral Development Company is currently conducting exploration including geophysical surveys and diamond drilling in a joint venture with Baroque Resources Limited of Vancouver.

Mapping by the Ontario Geological Survey (Wallace 1981) shows the property to be underlain by mafic metavolcanics in the northwest, a central band of metasediments 1 km wide, and a unit of felsic metavolcanics to the south. All units trend at 050°.

The Albany River Occurrence is exposed in a series of pits and trenches. A number of quartz veins, striking 020° and dipping 85° east, are hosted in mafic metavolcanics. The veins can be traced for 250 m along strike and contain minor pyrite and stibnite. A grab sample returned 165 ppb gold (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The Howells Lake Antimony Zone occurs to the south of a creek which drains into the west central side of Howells Lake. An extensive zone of carbonate alteration is associated with a porphyry intrusion. Shearing and quartz veining occur at the contact between mafic metavolcanics and graphitic schists. Associated with the quartz veining is green mica, pyrite, and stibnite. Drilling has defined two zones of mineralization. The western zone has a preliminary estimated tonnage of 83 000 tons of 1.37 percent antimony and 0.07 ounce gold per ton; the eastern zone contains 660 000 tons of 3.1 percent antimony and erratic gold values, to a depth of 150 m (Patterson *et al.* (1983). The western zone is open to the west and the eastern zone is open along strike; both zones are open to depth (M. Flanagan, Homestake Mineral Development Company, Thunder Bay, personal communication, 1986).

The Thompson Occurrence consists of a series of shear zones within mafic metavolcanics. Mineralization consists of disseminated pyrite, and drilling in 1951 returned up to 0.18 ounce gold per ton (Wallace 1981).

OTHER ACTIVITY IN THE FORT HOPE AREA

BP Canada Incorporated-Selco Incorporated carried out a diamond drill program on Miminiska Peninsula in 1984. Hole M-6 intersected an arsenopyrite-pyrrhotite bearing iron formation which returned 33.5 grams gold per tonne over 26 cm (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

Gold Fields Mining Corporation holds a large block of claims extending from north of the western end of Miminiska Lake to the Lilypad Lake area (16 km). A program of linecutting, geological mapping, geophysics, and diamond drilling is being carried out.

Other large blocks of claims include Dome Exploration Limited and Quinterra Resources Incorporated in the Keezhik Lake area, Noranda Exploration Limited in the Wottam Lake area, and Westmin Resources Limited near Opikeigen Lake.

LANSDOWNE HOUSE AREA

WINISK RIVER MINES LIMITED

The Winisk River Mines Property is located on Rowlandson Lake approximately 25 km north of Lansdowne House, Ontario. Winisk River Mines Limited carried out a program of trenching, geological mapping, and diamond drilling in 1937. Recently Blue Falcon Mines Limited (Forester Resources Incorporated) carried out a program of trenching, diamond drilling, and airborne geophysics.

Mapping by the Ontario Department of Mines (Prest 1942) shows that the property is underlain by mafic metavolcanics which have been intruded by gabbroic sills and granitic dikes. Work by Winisk River Mines Limited in the 1930s identified a number of "veins" hosted on the margins of these intrusions. Drilling at this time returned 5.5 m of 1.74 percent copper and 7.0 m of 0.53 to 0.83 percent copper, gold values of up to 8.7 ounces gold per ton across 40 cm were also reported (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). A chip sample taken in 1982 by J.Scott (Resident Geologist's Office) across 3 m of heavily mineralized gabbro assayed 1.40 percent copper, 0.15 percent nickel and 0.01 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto). Recent trenching by Blue Falcon Mines Limited has exposed several of these "vein" systems. The "Number 2 Vein" of Winisk River Mines (on claim Number 742865) is an aplite dike, composed of albite, tremolite with minor tourmaline, and pyrite. The dike follows a highly sheared contact between a granitic rock to the south and a mafic metavolcanic to the north, and ranges from 50 cm to 1 m wide. It can be traced for 100 m in trenching. Grab samples of the aplite dike returned <2 ppb (no sulphide mineralization) and 1300 ppb (3 percent pyrite) gold (Geoscience Laboratories, Ontario Geological Survey, Toronto). Approximately 300 m south, further trenching has exposed the "Number 4 Vein" of Winisk River Mines. The zone consists of highly deformed biotite-amphibole carbonate schist at the contact between gabbro and mafic metavolcanics and can be traced for 2500 m. A grab sample from the zone returned 1050 ppb gold (Geoscience Laboratories, Ontario Geological Survey, Toronto).

THUNDER BAY–SHEBANDOWAN AREA by J.F. Scott

Most of the exploration activity in the Thunder Bay-Shebandowan area is concentrated in two areas: the Moss Township-Burchell Lake area, and the area near the hamlet of Sunshine in Conmee Township. Still active, but to a lesser degree, is the Gold Creek area in southeastern Duckworth Township, and the property known as the Lakehead Gold Mines in Gorham Township. Some staking has taken place in MacGregor Township, located just east of the City of Thunder Bay boundary.

One of the prime aids to mineral exploration in the Moss Township area is the extensive system of forest access roads being built by Great Lakes Forest Products Limited. New occurrences have been found by prospectors along the new road right-of-way during construction. These roads also provide excellent access to areas of high mineral potential that have been virtually inaccessible by land routes in the past. Areas of notably increased access provided by new road construction are Moss Township, the Powell Lake area, and Begin, Lamport, and Duckworth Townships. Excellent cross sections of the southern part of the Shebandowan Belt are now accessible by road.

Tandem Resources Limited conducted diamond drilling on the Snodgrass Lake Occurrence. To date, the company has completed 30 drillholes for a total of 4572 m. While gold values were intersected in almost every hole, the best assays reported to date were from Hole No. 10. Values intersected include 1.43 ounces gold per ton over 3.35 m, 0.19 ounce gold per ton over 9.45 m, and 0.13 ounce gold per ton over 2.13 m (A.E. Storey, Geologist, Storimin Exploration Limited, Toronto, personal communication, December 1, 1986). A total of 9144 m of diamond drilling is planned. More drilling is contemplated this winter from the Snodgrass Lake ice.

In the Conmee Township area, near Sunshine, Noranda Exploration Company Limited is currently evaluating gold bearing pyrite mineralization hosted by hornblende syenitic and fragmental metavolcanics. These are situated approximately 3.5 km southwest of Sunshine. During 1985, the mineralized zones were delineated by induced polarization, VLF electromagnetometer, and magnetometer surveys and exposed in 12 trenches and tested by 5 diamond-drill holes totaling 1038.8 m. The best intersection reported to date is 4 m of 0.43 ounce gold per ton (George Cross Newsletter, November 25, 1986). Together with Northair Mines Limited (37.5 percent), Noranda is still evaluating the property; a program of diamond drilling is currently underway.

The Lakehead Gold Mines Property, located in south central Gorham Township, has recently been explored by Inco Limited who conducted induced polarization and geological surveys and drilled 4 diamond-drill holes for a total of 330.9 m. The property is located on patented land held by C.C. Poulin of Thunder Bay. Inco Limited has dropped its option on the property and currently Esso Minerals Canada retains the option on the ground.

The auriferous system that includes the Thunderhead Gold Mines Property, the Lakehead Gold Mines Property, the Gorham Gold Mines Property, and the Universal Gold Mines Property deserves to be re-evaluated as a total package. Old reports indicate very good gold values in the area of lots 11 and 12, concession II, Gorham Township. Here, in a trench located approximately 304 m west of the Hazelwood Lake road from a point about 2.5 km north of the City of Thunder Bay's northern boundary, gold values of up to 0.75 ounce per ton across 0.30 m have been reported (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). A new occurrence of intensely altered and gossan-stained metavolcanics has recently been uncovered by Lauri Suni, of Gorevale Road, Gorham Township, on his property situated just southwest of the main Thunderhead Gold Mines location in the northern sector of lot 13, concession I, Gorham Township. The owner plans to remove the overburden to expose the bedrock in order to ascertain the source of the intense gossan.

Recent activity in MacGregor Township, just east of the City of Thunder Bay is due to gold values found in pyrite-rich felsic metavolcanics. Major mylonitic shear zones are prevalent in the area (Scott and Seguin 1986).

BEARDMORE–GERALDTON PROGRAM by J.K. Mason and C.M. Hine

INTRODUCTION

The Beardmore-Geraldton Program is staffed by John Mason and Mike Hine. The object of the program is to stimulate exploration activity in the Beardmore-Geraldton area by assisting prospectors, geologists, and mining company personnel with property visits, sampling, mapping, literature searches, field trips, documentation of all occurrences, and interpretation of various geological environments.

PRODUCING GOLD MINES AND MAJOR EXPLORATION PROGRAMS

The Greenoaks Mine in Pifher-Elmhirst Townships, produced 600 tons of gold-silver-copper ore from the No. 1 and No. 2 veins in 1986. The ore was milled at the Canadian Concentrators Mill, Thunder Bay (Bill Miron, Canadian Concentrators, Thunder Bay, personal communication, 1986).

Metalore Resources Limited announced "a new gold discovery" (The Northern Miner, March 17 and 31, 1986) on the Brookbank Fault Zone, Irwin Township. Hudson Bay Gold Incorporated and Minorco

Canada (an indirect subsidiary of Minerals and Resources of Bermuda) have signed a letter of intent with Metalore to develop the gold-bearing zone (The Northern Miner, July 28, 1986). Ontex Resources Limited holds a 10 percent net profit royalty in the property (The Northern Miner, August 25, 1986).

Phoenix Gold Mines Limited continued with a multiphase exploration program on the Phoenix-Sturgeon River Gold Mine Property, situated in Irwin, Pifher, Walters, and Elmhirst Townships. Stripping, trenching, geological mapping, and channel sampling were conducted on numerous gold occurrences.

Norben Gold Resources initiated exploration on the Ralph Lake and Northern Empire Mine Properties.

Peddie Lake Mining Corporation conducted a multiphase program on their Meader-Pifher Township property. Stripping, trenching, sampling, geological mapping, ground geophysics, and diamond drilling were performed.

Sweany Gold Corporation-Nodaden Resources Limited carried out an exploration program for platinoid mineralization on the Eva-Kitto Township Ring Complex (peridotite-pyroxenite). The company also conducted exploration programs on several gold occurrences in Sandra, Meader, Pifher, and Irwin Townships. Stripping, trenching, sampling, ground and airborne geophysics, geological mapping, and diamond drilling were completed. Gunner Gold Incorporated has an option agreement on the gold properties.

Hardrock Extension Incorporated initiated a major diamond-drill program east of the Hardrock Mine. Stripping and ground geophysics were undertaken on the Geraldton Long Lake Gold Incorporated and Ferau Resources Incorporated Properties.

Noranda Exploration Company Limited continued a multiphase exploration program on the Twin Falls-Atlantic Mining gold Property, Irwin Township.

A summary of company exploration programs is outlined in Table 4.4.

GENERAL GEOLOGY AND STRUCTURE

The geology of the Beardmore-Geraldton area, a portion of the Wabigoon Subprovince, has been divided into two belts. The Beardmore-Geraldton Belt (composed of the Southern Metavolcanics Subbelt and Southern Metasedimentary Subbelt) and the Onaman-Tashota Metavolcanic Belt are separated by the Paint Lake Fault, a major transcurrent fault.

A detailed description of the geology and gold mineralization of the Onaman-Tashota Metavolcanic Belt and the Beardmore-Geraldton Belt is provided in Mason and White (1986), and by Mason and White *in* Patterson *et al.* (1984, 1985).

GOLD MINERALIZATION OF THE ONAMAN-TASHOTA METAVOLCANIC BELT

Gold is hosted in three environments in the Onaman-Tashota Belt:

1. Vein Type Deposits Gold is associated with quartz (carbonate) veins hosted by felsic to intermediate metavolcanics, and often located marginal to felsic intrusion (dikes or stocks) (stock-related).

2. Chemical Metasediment Type Gold is hosted by chemical metasediments.

3. Shear Disseminated Type Shear zones with disseminated pyrite, pyrrhotite, and/or chalcopyrite with related gold mineralization cut felsic metavolcanic rocks, typically crystal tuffs, lapilli tuffs, volcanic breccias, rhyolite, dacite, and/or related feldspar (quartz) porphyry.

Phoenix Gold Mines Limited

Phoenix Gold Mines Limited completed year three of an exploration program on the Quebec-Sturgeon River Gold Mine property, 20 km northeast of Beardmore. The property consists of 35 leased claims located at the common corner of Irwin, Walters, Pifher, and Elmhirst Townships on the southern side of the Sturgeon River (Namewaminikan River). The Quebec-Sturgeon River Gold Mine produced 73 438 ounces of gold from ore grading 0.51 ounce gold per ton from the #3 vein between 1936 and 1942 (Mason and McConnell 1983). During 1986, stripping, trenching, channel sampling, and detailed mapping were conducted on auriferous quartz and quartz-carbonate veins north and west of the former mine site, on the Macjoe Block, and to the east on the Agaura Block.

The Phoenix Property is underlain by intermediate to felsic metavolcanics. The metavolcanics are medium grey to dark green and can be massive to foliated. Porphyritic to homogeneous rhyolite to dacite, tuffs, and lapilli-tuffs have been noted. The metavolcanics are intruded by the Elmhirst Lake Stock (granodiorite and quartz diorite) to the north and the Coyle Lake Stock (porphyritic granodiorite to granodiorite) to the east, as well as Archean mafic dikes and Late Precambrian diabase dikes.

Veining is proximal to the contact area between the metavolcanics and the Elmhirst and Coyle Lakes Stocks. The veins can be hosted in granodiorite, quartz diorite, or feldspathic and porphyritic rhyolite to dacite. Lenticular quartz and quartz-carbonate veins are associated with ductile shearing or simple, single fractures.

The Marge Vein (85-M-1), located 480 m north of the old shaft, discovered and worked in 1985, was the site of detailed surface exploration during 1986. Assay results from the 1985 program indicated an average grade of 0.727 ounce gold per ton over an average width of 35.66 cm for a length of 152 m (L. Koskitalo, Project Geologist, Phoenix Gold Mines Limited, Toronto, personal communication, 1986). The Marge Vein has now been exposed for approximately 300 m. The vein is boudinaged, hosted in an altered granodiorite (a portion of the Elmhirst Lake Stock) and strikes approximately 040° with a variable dip. The vein ranges up to 1.2 m in width. Channel sampling during 1986 returned comparable widths and assay values relative to the 1985 program. The northeastern end of the Marge Vein assayed 1.51

TABLE 4.4: COMPANY EXPLORATION PROGRAMS IN THE BEARDMORE-GERALDTON AREA 1986

Company	Township/Area	Exploration
Andaurex Resources Incorporated	Onaman Lake Area	Geology, D.D.H., A.E.M., A. Mag.
Anglo-Canadian Mining Corporation	Pifher Township	D.D.H.
Canadian Gold Resources Incorporated	Rickaby, Walters, Leduc, Irwin, Lapierre Townships	A.E.M., A. Mag., D.D.H.
COMINCO Limited	Fort Hope	D.D.H.
Dome Exploration (Canada) Limited	Walters-Leduc Townships	D.D.H.
Elmhirst Syndicate	Pifher-Elmhirst Townships	I.P.
Geraldton Long Lake Gold Incorporated - Ferau Resources Incorporated	Long Lake Area	Stripping, geophysics
Getty Resources Limited	Klotz Lake Area	Linecutting, D.D.H.
Gold Fields Canadian Mining Limited	Fort Hope Area	Geology, sampling, geochemistry, geophysics
Hardrock Extension Incorporated	Ashmore Township	D.D.H.
Harte Resources Limited	Oboshkegan Township	D.D.H.
Homestake Mineral Development Company	Fort Hope Area	Geology
Hudson Bay Exploration and Development Company Limited	Hipel Township	Geology, geochemistry, sampling
Hudson Bay Exploration and Development Company Limited	O'Meara Township	Prospecting
Lac Minerals	Errington Township	Geology, sampling
Metalore Resources Limited	Irwin Township	D.D.H.
Monopros Limited	Albany River - Geraldton Area	Heavy mineral sampling
Muscocho Explorations Limited - Tashota Nipigon Mines Limited	Onaman Lake	D.D.H.
Noranco Explorations	Fort Hope Area	Geology
Noranda Exploration Company Limited	Irwin-Pifher Townships	Stripping, trenching, sampling, geology, I.P., D.D.H.
Northair Mines Limited	Irwin Township	Sampling, geology
Orevco Incorporated	McComber Township	Stripping, sampling
Orevco Incorporated	Summers Township	Stripping, sampling, geology
Parquet Resources Incorporated	Sandra-Meader Townships	Linecutting, D.D.H.
Peddle Lake Mining Corporation	Pifher-Meader Townships	Stripping, trenching, sampling, geology, Mag., E.M., D.D.H.
Phoenix Gold Mines Limited	Irwin, Pifher, Walters, Elmhirst Townships	Stripping, trenching, sampling, geology
Portfield Industries Incorporated/Nodaden Resources Limited	Irwin-Meader Townships	D.D.H.
Pronto Explorations Limited	Walters-Leduc Townships	D.D.H.

TABLE 4.4: Continued

Company	Township/Area	Exploration
Royal Oak Resources	Fulford Township	Linecutting, geology, geophysics
Sweany Gold Corporation	Kitto-Eva Townships	Sampling, geology
Sweany Gold Corporation - Nodaden Resources Limited	Sandra, Meader, Pifher, Irwin Townships	Stripping, trenching, sampling, geophysics, geology, D.D.H.
Syngold Exploration Incorporated	O'Sullivan Lake	D.D.H.
Tenacity Mining Company	Pifher-Meader Townships	A.Mag., A.E.M.

Abbreviations:

A.E.M. - Airborne electromagnetic survey
A. Mag - Airborne magnetometer
D.D.H. - Diamond-drill hole
I.P. - Induced polarization

ounces gold per ton over 0.91 m; the vein continues under overburden.

Small scale features display sinistral strike slip motion. Two generations of quartz are present within the vein; an initial quartz vein has been brittley fractured and healed with a second generation of hydrothermal silica fluid. Sutures can be noted into the wallrock. Local sericite alteration is present in the vein walls, and xenoliths of metavolcanic are present along the trend of the vein.

The Allard Vein, which is located approximately 75 m north of the Marge Vein and the "F" Vein, which is located in the immediate area. Both host visible gold.

Surface stripping was conducted on veins in the western portion of the Macjoe Block. The M-2 vein is a lenticular quartz vein up to l m wide hosted in a felsic lapilli-tuff. Tourmaline has selectively replaced clasts within the lapilli-tuff resulting in a tourmaline alteration halo extending up to 2 m from the vein. The vein strikes 170° but has little or no tourmaline within it. The implied sequence of formation is as follows:

1. volcanism
2. tectonism producing a fracture
3. tourmalinization about the fracture
4. hydrothermal activity producing the quartz vein
5. diabase dike intruded within and conformable to, the vein

Robert King, University of Western Ontario, is undertaking a thesis study of tourmaline and gold deposits in the Superior Province. Vein M-2 is included in the research.

Negotiations are underway regarding the possibility of having the Sturgeon River Gold Mine waste dump photometrically sorted (L. Koskitalo, Project Geologist, Phoenix Gold Mines Limited, Toronto, personal communication, 1986).

Kenty Au-Mo Prospect

The Kenty Au-Mo Prospect is located in the Onaman Lake area 1.6 km south of Conglomerate Lake.

The Brennan-Kenty mining group discovered a gold-molybdenum occurrence in 1924 and staked claims KK800 and KK831. G. Menifee, A. Poulin, R. Yappat, and A. Shaw staked the present claim group which was subsequently acquired by W. Langridge, Jr. From 1951 to 1955 Chontor Mining Corporation Limited conducted surface exploration including linecutting and an electromagnetic survey on the property. The claim was brought to lease by 1960. Jorsco Explorations Limited (1961 and 1962) and Cominco Limited (1984) conducted drill programs prior to Andaurex Resources Incorporated's current exploration program. An airborne magnetic and electromagnetic survey, geological survey, and a two-phase diamond drill program have been completed during 1986.

The Kenty Prospect is underlain by massive, altered, and recrystallized mafic flows and tuffs, that are part of the Onaman-Tashota Metavolcanic Belt (Amukun 1980). A narrow sequence of intermediate to felsic metavolcanics outcrops west of the Kenty Property and consists of feldspar porphyry, quartz porphyry, and breccia. Intruding the metavolcanics is a small porphyritic quartz monzonite-granodiorite complex immediately to the southeast.

The Kenty Au-Mo Prospect consists of two geologically similar gold mineralized zones. Strongly foliated to sheared pillowed metabasalts and mafic tuffs have been intruded by feldspar porphyry dikes composed of subhedral zoned feldspars in a fine pink matrix. Foliation (C) within the metavolcanics typically trends 057° to 065°. A crenulation cleavage (C'), striking 140° to 142° postdates the initial cleavage. Quartz veins are foliation (C) parallel to subparallel and vary from lenticular veins to discontinuous lenses. Silicification, carbonatization, and potassium alteration are present in the metavolcanics.

TABLE 4.5: EXPLORATION PROGRAMS IN THE SCHREIBER-TERRACE BAY AREA IN 1986

Company/Individual(s)	Township/Area	Exploration Activity
Acker, W.	Priske, Strey Townships	Bulk sampling
Allen, W.	Marathon	Prospecting
Camber Exploration Company Limited	Priske Township	Geochemical Survey
Corporation Falconbridge Copper	Priske Township, Big Duck Lake	Mining, stripping, geology, geochemical/geophysical surveys, drilling, mineral exploration
Cumberland Resources Limited	Victoria Lake	Geological mapping
Eldorado Resources Limited	Tuuri Township	Mineral exploration, road building, linecutting, geophysical surveys (Max-min, VLF and shoot-back EM, Mag) and 543.2 m of diamond drilling
Ferguson, A. Ferguson, J.	Syine Township	Prospecting, stripping, trenching
Fleck Resources	Marathon	Feasibility study, bulk sampling, channel sampling, stripping, trenching, diamond drilling
Fowler, B.	Coldwell Area	Prospecting
Franklin Resources	Strey Township	Geological and geochemical surveys, analytical
Galarneau, T. Patterson, R.	Kabamichigama Lake	Mining, trenching, stripping
Halonen, L.	Nishin Lake Cavers Area	Power stripping, trenching, bulk sampling, survey
Hamel, R.	Fishnet Creek (Syine Township)	Diamond drilling, trenching
Highwood Resources Limited	Walsh Township	Geological and geochemical surveys, relogging of diamond drilling
International Wildrose Resources	Prairie Cove - Prince Point (Walsh Township)	Geological mapping, geochemical and geophysical surveys, stripping, trenching and prospecting
Joa, M.	Coldwell Area (Seeley Lake Area)	Prospecting, trenching, stripping
MacRae, G.	Pic-Lecours Township	Drilling, geological mapping, stripping, trenching
Kraehling, J.	Priske Township	Bulk sampling
Kusserow	Heron Bay	Prospecting
Lincoln Resources Incorporated	Priske Township	Diamond drilling, stripping, and trenching
McCabe, R.J.	Deadhorse Creek (Walsh Township)	Prospecting, drilling
McChristie, W. Petrunka, D. (Thor Lake Explorations Corporation)	Coldwell Area Bamoos Lake	Prospecting, stripping

TABLE 4.5: Continued

Company/Individual(s)	Township/Area	Exploration Activity
Megalode Resources Incorporated	Priske Township	Geophysical Surveys, Magnetometer and VLF
Metallgeselleshaft Company Limited	Goldbar Lake	Mineral exploration, geological surveys, diamond drilling
Micham Exploration Incorporated Fogen, M.?	Syine Township Marathon	Mineral exploration Prospecting?
Moschnik, D.	Priske Township	Prospecting
Moses, P.	Heron Bay	Prospecting
Nevins, P.	Manitouwadge	Prospecting
Niskanen, T.	Cosgrave Lake	Prospecting
Noranda Exploration Company Limited	Killala Lake, Priske Township, Killraine Township, Pays Plat Area	Mineral exploration
OreQuest Consultants Limited	Lorna Lake, Seeley Lake, Santoy Lake	Geological surveys, soil sampling, geophysical surveys, mineral exploration
Otto, R.	Priske, Strey Township	Prospecting
Patterson, T. Mikkonen, R. PatMikko Resources	Priske Township	Prospecting, stripping, trenching, bulk sampling, mill development
Petrunka, D.	Seeley Lake Angler Creek	Stripping
Renner, R.	Coldwell Area Pic River	Prospecting
Sande, N. Sperle, K. Hibbart, N.	Gravel River - Dickson Lake Area	Airborne geophysical surveys, AEM, Magnetometer
Skalesky, P.	Priske Township	Trenching, stripping, prospecting
Tomavack Resources Incorporated	Syine Township	Diamond drilling
Walton, R.	Marathon	Prospecting

In the past, gold mineralization was noted exclusively in association with the quartz. Pyrite and molybdenite also occur in the veins. Andaurex Resources Incorporated has recently (1986) obtained gold values associated with fine pyrite in foliation and/or shear planes.

Andaurex reported results from drillholes: "Hole one cut 5 feet grading 0.16 ounce and 20 feet grading 0.06 ounce [gold per ton]...Hole No. 2 cut 5 feet grading 0.29 ounce gold per ton" (The Northern Miner, August 11, 1986).

Sweany Gold Corporation-Nodaden Resources Incorporated

Sweany Gold Corporation-Nodaden Resources Incorporated hold 111 mining claims northeast of Beardmore. The claims are in several blocks, covering a number of gold occurrences in Meader, Pifher, Sandra, and Irwin Townships. Previous exploration on the claims has been limited. Exploration during 1986 included stripping, trenching, sampling, geological mapping, ground and airborne geophysics (airborne magnetic and electromagnetic) and limited diamond drilling.

The geology of the Sweany-Nodaden Properties is dominated by intermediate to felsic metavolcanics, with minor mafic metavolcanics and mafic intrusive rocks. Felsic metavolcanics consist of feldspar porphyritic crystal tuffs, lapilli-tuffs, and minor breccias.

The original discovery occurrence on the property, termed the "Peddle Lake Occurrence", was described in Patterson *et al.* 1986. Three additional auriferous zones, on the same claim (TB863167) were located in early 1986 using a VLF electromagnetic survey combined with power stripping. Two other significant gold occurrences received extensive exploration: the Gerry Bruce Occurrence, and the M. Cowan Occurrence.

The Gerry Bruce Occurrence was discovered in late 1985 by the prospector whom the showing is named after. The gold occurrence is located north of the Mason Lake Fault in the southern portion of Meader Township on claim TB861642. The host rock is a massive quartz-feldspar tuff to lapilli-tuff of intermediate composition containing fine cherty shards. A pyritic mineralized shear zone with associated quartz veining hosts gold mineralization. The vein coring the shear zone strikes 070° to 080° and dips steeply to the south. It ranges up to 1.2 m wide and has been exposed in the main No. I trench for approximately 55 m. The quartz can be massive to fractured and locally brecciated, containing clots and lenses of pyrite, chalcopyrite, galena, and sphalerite. Values range up to 6.22 ounces gold per ton and 11.71 ounces silver per ton for selected grab samples (P. Lassila, Consulting Geologist, Ajax, personal communication, 1986).

The M. Cowan Occurrence in Sandra Township was acquired and worked during 1986. The Cyril Knight Prospecting Company conducted surface exploration from 1934 to 1935 on the property, then known as the "West Group". Mike Cowan, property vendor, conducted a ground magnetometer survey in 1984.

Laird (p. 98, 99, 1937) described the geology and mineralization of the "West Group":

> The "West group" is underlain mainly by volcanic tuffs and agglomerates, which have been intruded by a few small dikes and bosses of granite. A portion of the western part is occupied by the Keweenawan diabase flow. The main showings occur on claim T.B.14853. Near the middle of this claim a quartz vein or series of lenses has been traced for 627 feet. Near the trail this vein attains a maximum width of 17 feet but narrows considerably in either direction. It strikes N45°W and dips from the vertical to 55°N. The quartz is well-fractured and milky white, and on the whole is rather sparsely mineralized with pyrite, chalcopyrite, and gold; in one pit near the west end rather massive chalcopyrite was encountered. The gold is confined largely to the main quartz lens, which is crossed by the trail leading from Musca Lake. This lens is 45 feet long and has a maximum width of 17 feet. In channel-sampling, it was found that the highest gold content occurs where the lens is widest. One small "pay streak" is said to have yielded 1.90 ounces of gold over a width of 7 inches, but the streak is only 2 feet long.

Work during 1986 consisted of a stripping program to expose a large carbonatized, hematized, and silicified crystal tuff unit which hosts quartz veins and lenses similar to those described by Laird (1937). A granodiorite intrusion that outcrops in the southwest is in contact with the felsic metavolcanics. The stripped area is presently 300 by 30 m and trends 095°, following the regional foliation. Channel sampling, detailed mapping, and ground and air geophysics were conducted. Six airborne electromagnetic anomalies were detected, proximal to the occurrence. Gold mineralization is associated, not only with pyrite, chalcopyrite, and pyrrhotite within quartz veins and lenses, but with altered felsic tuffs.

Peddle Lake Mining Corporation

Peddle Lake Mining Corporation conducted a detailed exploration program on their Meader, Pifher, and Sandra Townships gold property.

An extensive stripping program, combined with detailed mapping, channel sampling, and diamond drilling, was utilized on a large induced polarization anomaly in the southwestern portion of Pifher Township (claim TB863244). Previous work by Lynx-Canada Explorations Limited in 1974 located the anomaly which measures approximately 700 m long by 90 to 210 m wide and strikes at 115°. Geological mapping and ground magnetometer and VLF surveys were undertaken on the entire claim block to locate other gold targets.

The Peddle Lake Property is underlain by felsic metavolcanics, including crystal tuffs, feldspar porphyry, lapilli-tuffs, felsic breccias, and ignimbrites (pumice, obsidian, and welding were noted). In contact to the north is a mafic to intermediate metavolcanic unit, which consists of mafic tuffs and flow rocks, and mafic intrusive rocks (gabbro, diorite). A feldspar porphyry (subvolcanic), tonalite and/or granodiorite unit is located at the contact area coincident with the main Lynx-Canada induced polarization anomaly (Dave Kresz, Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto, personal communication, 1986).

Gold mineralization is related to quartz veins, in joint sets, two of which strike at 095° to 115° and 030°. More importantly, gold is associated with disseminated pyrite, pyrrhotite, and chalcopyrite in carbonatized feldspar porphyry (subvolcanic) and minor crystal tuff, andesite, dacite, and rhyolite (D. Pudifin, Consulting Geologist, Val D'Or, personal communication, 1986).

The geological mapping and ground VLF and magnetometer surveys have outlined target areas to be stripped and/or diamond drilled during 1987.

GOLD MINERALIZATION OF THE SOUTHERN METAVOLCANIC SUBBELT

The geology and gold mineralization of the Southern Metavolcanic Subbelt, a portion of the Beardmore-Geraldton Belt, has been described by Mason and White *in* Patterson *et al.* (1985).

Gold is associated with three environments:

1. shear zones
2. iron formations
3. quartz (carbonate) veins

Norben Gold Resources

Norben Gold Resources commenced a surface stripping, channel sampling, and diamond drilling program on two gold properties in the Beardmore area.

The western end of the Power Vein, the main production vein of the Northern Empire Mine (Pan-Continental Mining (Canada) Limited), Summers Township, has received a concentrated exploration program. Three hundred metres of the western end of the vein have been stripped and channel sampled. The Northern Empire Mine produced 149 493 ounces of gold from 1934 to 1941, and in 1949) (Mason *et al.* 1985).

The Power Vein intrudes mafic to intermediate metavolcanics, mainly tholeiites. The vein strikes 072° and dips 80°S with an average width of 0.60 m, and can be a either a single quartz vein or a composite vein system in a 1.2 to 1.5 m wide shear zone. The quartz is mineralized with pyrite, arsenopyrite, pyrrhotite, and minor chalcopyrite, native gold, galena, carbonate, and tourmaline. A zone on the western portion of the Power Vein, 113 m long by 1.5 m wide, assays 3.72 grams gold per tonne (S. Wilkinson, President, Norben Gold Resources, Peterborough, personal communication, 1986).

Ten tons of mine dump material has been trial sorted using a mobile ore-sorting machine with both photometric and electrical conductance/magnetic sensing capabilities at Orevco Incorporated's (Norben affiliate) recently constructed ore sorter machine (Model 27), currently based in Peterborough. By early 1987, the same sorter will be added to the Pancontinental Mining (Canada) Limited's 200 ton per day mill circuit, a recent Norben acquisition. The mill will be operable in the Spring of 1987 and available for custom ore processing by the first half of 1987 (Steve Wilkinson, President, Norben Gold Resources, Peterborough, personal communication, 1986).

The Delbridge Zone, McComber Township, has been stripped and sampled and will be diamond drilled. The zone which is located northeast of Ralph Lake occurs in a massive to recrystallized chert/magnetite iron formation hosted in sheared iron tholeiites (Carter 1983). The strike length of the zone has been extended to 300 m within a 500 m long stripped area. The chert unit averages 2 m in width, is well fractured and laminated and contains sulphide mineralization, magnetite, chlorite, and tourmaline. Gold is associated with subhedral to euhedral coarse arsenopyrite and minor pyrite. In addition, auriferous quartz vein(s) intrude the chert or chert-metavolcanic contact conformably.

A saccharoidal chert zone was located during the 1986 program parallel to the Delbridge Zone. Channel sampling on the Delbridge Zone and the new zone has been completed and some analytical results are available (November 18, 1986). Assays up to 1.5 m of 31.9 gm/ton gold have been realized for the Delbridge Zone (S. Wilkinson, President, Norben Gold Resources, Peterborough, personal communication, 1986).

PROPERTY VISITS 1986: BEARDMORE-GERALDTON PROGRAM

The following properties, visited during 1986, are shown on Figure 4.4.

1. Angle Lake Occurrence (E. Rentz)
2. G. Bruce Occurrence (Sweany Gold Corporation-Nodaden Resources Limited)
3. Brookbank Prospect (Metalore Resources Limited)
4. Clist Lake Property (G. Stankey)
5. L. Cox Occurrence
6. M. Cowan Occurrence (Sweany Gold Corporation-Nodaden Resources Limited)
7. Crooked Green Creek Mine (Anglo Canadian Mining Corporation)
8. Duchene Occurrence
9. Goodman-Summers Townships Occurrence
10. Goodman-Dumont Lake Occurrence
11. Greenoaks Mine (B. Miron)
12. Hardrock Extension Occurrences (Hardrock Extension Incorporated)
13. Hardrock Gold Mines Open Stope (Lac Minerals Limited)
14. Head Occurrence
15. Hutchison Lake Mine (Royal Oak Resources Limited)
16. Jacobus Mines Limited Cu-Ni Prospect
17. Kenty Au-Mo Prospect (Andaurex Resources Incorporated)
18. Kirby Lake Zinc Occurrence (J. Oster)
19. Macjoe Property (Phoenix Gold Mines Limited)
20. Madjek Property
21. Maki Prospect (Noranda Exploration Company Limited)
22. Marge Vein (Phoenix Gold Mines Limited)
23. Megan S.W. Occurrence
24. Miron-Elmhirst Occurrence (B. Miron)
25. Orphan Mine (Canadian Gold Resources Incorporated)
26. Peddie Lake Occurrence (Peddie Lake Mining Corporation)
27. A. Pichette Occurrence
28. G. Pichette Occurrence
29. Prince-Cono Occurrence (Metalore Resources Limited)
30. Twin Falls Prospect (Noranda Exploration Company Limited)
31. Watson Lake Occurrence (E. Rentz)

RECOMMENDATIONS FOR EXPLORATION

Lithological contacts within the Beardmore-Geraldton Belt are almost exclusively fault contacts, and can be auriferous (e.g. Brookbank Zone, Metalore Resources Limited). Larger exploration targets, potentially leading to fault controlled pyrite associated gold occurrences, can be alteration zones enriched in silica, carbonate, potassium, and/or hematite. The author notes that diorite/gabbro is often spatially associated with faults and gold mineralization (e.g. Bankfield-Tombill Fault, Brookbank Fault).

The Onaman-Tashota Metavolcanic Belt should be prospected for potential gold-bearing disseminated sulphide occurrences. This style of mineralization has been recognized on the Noranda-Atlantic, Sweany-Nodaden, Peddie Lake Mining, and Andaurex-Kenty Au-Mo properties.

Platinum and palladium mineralization should be explored for within all mafic-ultramafic intrusions. Identified copper-nickel prospects (e.g. Jacobus, Juneau Lake, Toronto Lake) should be resampled and analyzed for platinum group elements. Sulphide mineralization associated with other intrusions (e.g. west of O'Sullivan Lake) should also be analyzed.

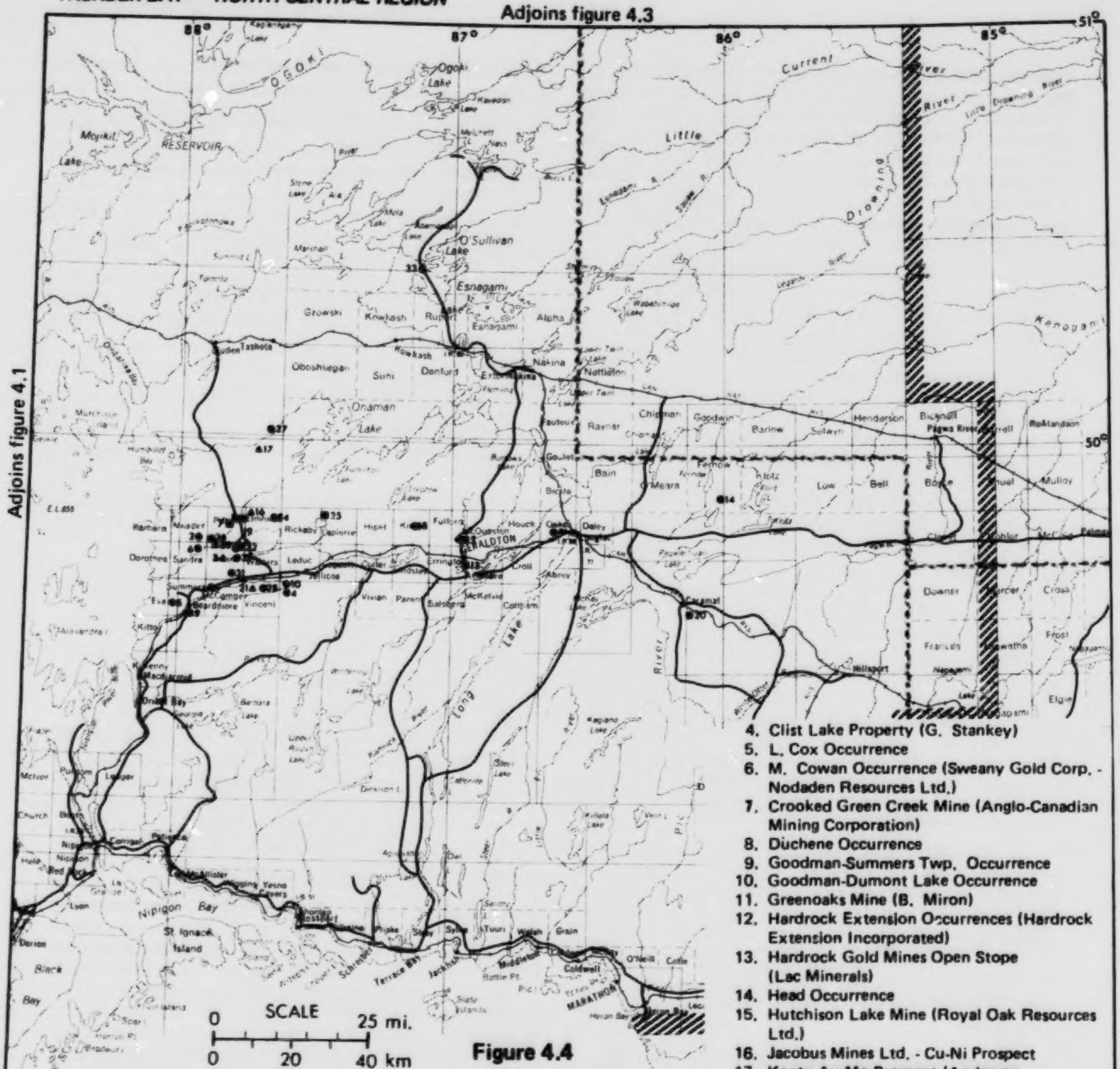
Adjoins figure 4.3
Adjoins figure 4.1
88°
87°
86°
85°
51°
50°
OGOKI
RESERVOIR
Mojikit Lake
Ogoki Lake
O'Sullivan Lake
Esnagami Lake
Current River
Little Current River
Drowning River
Kenogami
Onaman Lake
Nakina
Geraldton
Beardmore
Macdiarmid
Orient Bay
Nipigon
Red Rock
Nipigon Bay
St. Ignace Island
Black Bay
Long Lake
Caramat
Hillsport
Schreiber
Terrace Bay
Jackfish
Rossport
Coldwell
Marathon
Heron Bay
Pic River
Tashota
Kowkash
Dorothea
Sandra
Summers
Leduc
Rickaby
Vivian
Parent
Croll
Abrey
Daley
Houck
Fulford
Barlow
Goodwin
Chipman
Henderson
Bain
Meara
Low
Bell
Doyle
SCALE
0
25 mi.
0
20
40 km

Figure 4.4

■ **MINE (including past producers)** with a minimum production of not less than 100 ounces of gold

▲ **PROSPECT** with significant development work usually consisting of one or more of the following:

(a) Production of less than 100 ounces of gold;
(b) Over 100 feet of underground lateral development work;
(c) Over 600 metres (2000 feet) of diamond drilling.

● **OCCURENCE** Little development work carried out

PROPERTY VISITS 1986: BEARDMORE-GERALDTON PROGRAM

1. Angle Lake Occurrence (E. Rentz)
2. G. Bruce Occurrence (Sweany Gold Corp. - Nodaden Resources Ltd.)
3. Brookbank Prospect (Metalore Resources Ltd.)
4. Clist Lake Property (G. Stankey)
5. L. Cox Occurrence
6. M. Cowan Occurrence (Sweany Gold Corp. - Nodaden Resources Ltd.)
7. Crooked Green Creek Mine (Anglo-Canadian Mining Corporation)
8. Duchene Occurrence
9. Goodman-Summers Twp. Occurrence
10. Goodman-Dumont Lake Occurrence
11. Greenoaks Mine (B. Miron)
12. Hardrock Extension Occurrences (Hardrock Extension Incorporated)
13. Hardrock Gold Mines Open Stope (Lac Minerals)
14. Head Occurrence
15. Hutchison Lake Mine (Royal Oak Resources Ltd.)
16. Jacobus Mines Ltd. - Cu-Ni Prospect
17. Kenty Au-Mo Prospect (Andaurex Resources Inc.)
18. Kirby Lake Zinc Occurrence (J. Oster)
19. Macjoe Property (Phoenix Gold Mines Ltd.)
20. Madjek Property
21. Maki Prospect (Noranda Exploration Co. Ltd.)
22. Marge Vein (Phoenix Gold Mines Ltd.)
23. Megan S.W. Occurrence
24. Miron-Elmhirst Occurrence (B. Miron)
25. Orphan Mine (Canadian Gold Resources Inc.)
26. Peddle Lake Occurrence (Peddle Lake Mining Corporation)
27. A. Pichette Occurrence
28. G. Pichette Occurrence
29. Prince-Cono Occurrence (Metalore Resources Ltd.)
30. Twin Falls Prospect (Noranda Exploration Co. Ltd.)
31. Watson Lake Occurrence (E. Rentz)

RESEARCH AND MAPPING

Derek Wyman, University of Western Ontario, initiated a doctoral study of lamprophyre and gold deposits in the Superior Province.

Robert King, University of Western Ontario, initiated a doctoral study of tourmaline and gold deposits in the Superior Province.

Dave Kresz, Precambrian Geology Section, Ontario Geological Survey, mapped the bedrock geology of Barbara, Meader, and Pifher Townships.

Rik Kristjansson, Engineering and Terrain Geology Section, Ontario Geological Survey, mapped the surficial geology of the Geraldton area.

L. H. Thorleifson, Terrain Sciences, Geological Survey of Canada, mapped the regional surficial geology of the Albany River to Geraldton area.

Howard Williams, Brock University, studied the Quetico-Wabigoon Subprovince Boundary area.

SCHREIBER–MARATHON PROGRAM by B.R. Schnieders and A.A. Speed

INTRODUCTION

In 1986, the Schreiber-Marathon Program entered its fourth year of operation. B.R. Schnieders and A.A. Speed are responsible for the program and operate from the Thunder Bay Resident Geologist's Office. The purpose of the program is to stimulate exploration activity. The program covers an area from Nipigon, east to Marathon.

During 1986, approximately 30 properties were examined in the program area. Several of these are described below in detail. All assays reported were performed by the Geoscience Laboratories, Ontario Geological Survey, Toronto, unless otherwise noted.

The general geology and exploration history of this area are described by Schnieders and Speed *in* Patterson *et al.* (1985).

ECONOMIC GEOLOGY

Exploration activity in the Schreiber-Marathon area focused on gold, base metals, and platinum group elements during 1986. While 90 percent of the high potential ground for gold and base metals (metavolcanics and metasediments) remained staked in 1985, sections of these belts became open during 1986. Ground acquisition and exploration for the platinum group elements (PGE) was at an increased level in 1986, due in part to a sudden price surge of platinum in August.

GOLD MINERALIZATION

Recent studies on the controls of gold mineralization and the role of felsic intrusions in gold mineralization in the Schreiber-Terrace Bay area have been performed by Carter (1980a, 1980b), Marmont and Colvine (1981), Marmont (1983, 1984), and Patterson *et al.* (1984, 1985). The following subdivision of mineralization types incorporates results of the above studies and is based on a continual modification. For detailed descriptions of the classification types, the reader is referred to Schnieders and Speed *in* Patterson *et al.* (1984, 1985).

Type 1: Terrace Bay Batholith—Contact Zone Type

Gold mineralization is concentrated in quartz carbonate veins and altered host rocks, occupying faults, fractures, and shear zones, spatially and structurally related to the margins of the Terrace Bay Batholith.

The lithological variation between the intrusive rocks and the contact rocks produced a competency difference capable of focusing structural deformation. Faults and shear zones which represent conduits for hydrothermal solutions, are abundant in the northwestern contact zone of the Terrace Bay Batholith (Colvine *et al.* 1984). This type of mineralization is further described by Schnieders and Speed *in* Patterson *et al.* (1985, 1986).

Ferguson Occurrence–Mogotherium Occurrence Area Recent prospecting in the Noslo Lake area has led to the discovery of numerous quartz±carbonate veins containing gold, silver, lead, and copper mineralization, with accessory bismuth and tellurium. The Mogotherium Megatherium, Elgin Silver, and Empress Properties were explored as early as the 1860s, while more recent discoveries such as the Siville-Ferrier, Hamel-Doyan and Ferguson Occurrences have seen little exploration activity (Figure 4.5). These occurrences are located in the central to northeastern section of Syine Township, within an approximate 3 km radius of each other (Figure 4.5).

The Ferguson Occurrence is located approximately l km northeast of the northern shore of Noslo Lake and Highway 17 (Figure 4.5). The Mogotherium Occurrence is located l km east of Noslo Lake, several metres off of Highway 17. Both properties are held by A. Ferguson of Terrace Bay.

The occurrences are situated within the contact zone between intrusive rocks of the Terrace Bay Batholith and Archean metavolcanics and metasediments. Quartz veins, oriented subparallel to the granite-metavolcanic contact, are hosted predominantly within the metavolcanics and metasediments at the actual contacts with the felsic intrusive rocks. In this area, numerous metavolcanic and metasedimentary xenoliths, roof pendants, and inclusions are evident within the felsic intrusive rocks of the Terrace Batholith.

Gold and silver mineralization, with accessory bismuth, copper, and lead, occurs sporadically within narrow quartz veins. The Ferguson vein strikes 300° and dips 45° to 50° southwest and has an approximate strike length of 5 m, which is poorly exposed in a creek bed. A soft silvery mineral is present within the 12 cm wide vein. X-Ray Fluorescence (XRF) of the mineral identified the presence of bismuth, silver, tellurium, lead, copper, and sulphur (T. Griffith, Professor, Lakehead University, Thunder Bay, personal communication, 1986). Quartz vein samples from the Mogotherium Occurrence indicate the presence of pyrite, pyrrhotite, and galena.

Assays of selected grab samples from quartz veins in this area indicate values up to 0.38 ounce

Adjoins figure 4.3

Adjoins figure 4.1

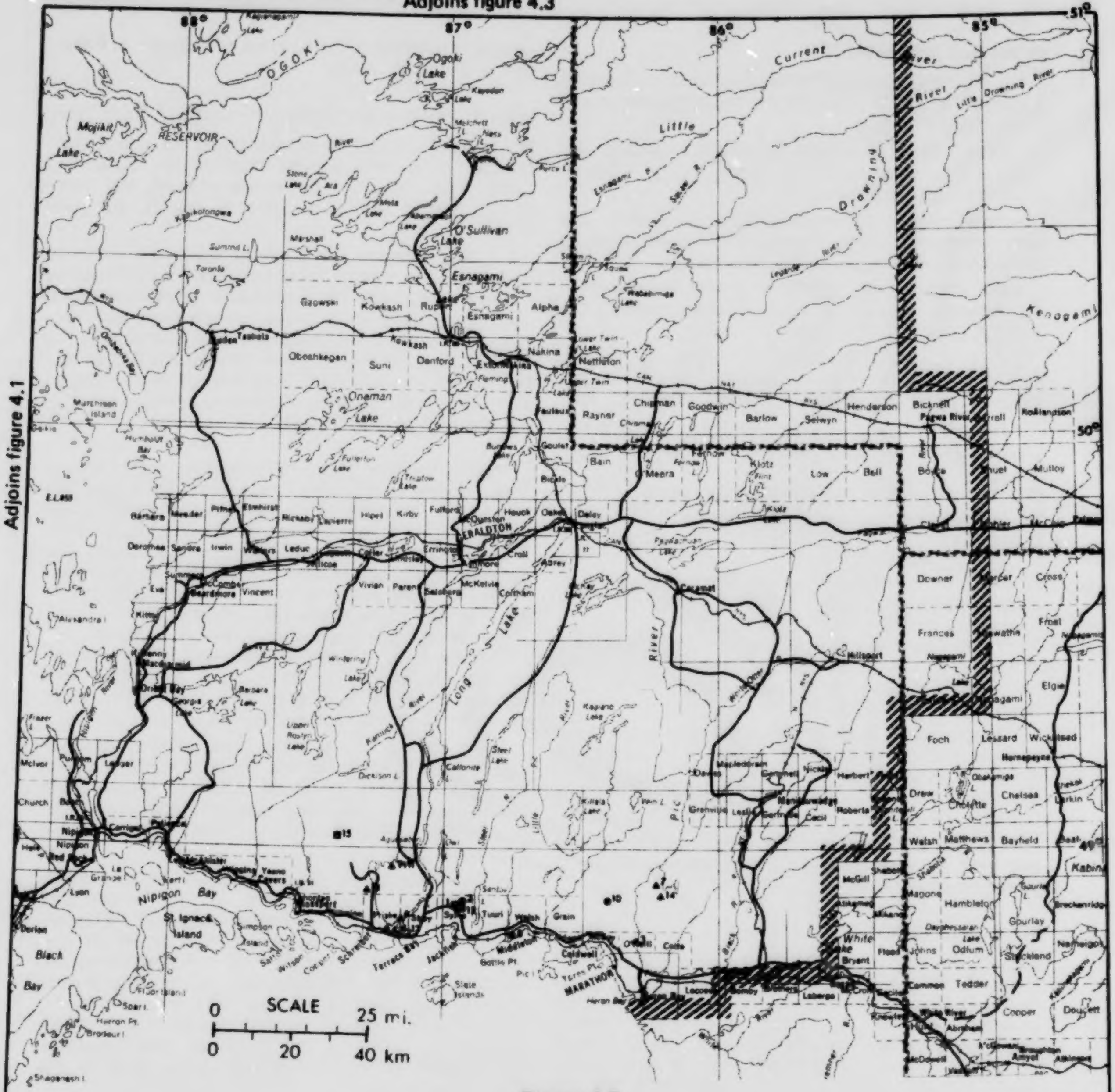
88°
87°
86°
85°
51°
50°
49°
OGOKI RESERVOIR
Ogoki Lake
Mojikit Lake
O'Sullivan Lake
Esnagami
Current River
Little Current River
Kenogami
Nakina
Oneman Lake
GERALDTON
Long Lake
Nipigon Bay
St. Ignace Island
Black Bay
Terrace Bay
Schreiber
Jackfish
MARATHON
Pic R.
Manitouwadge
White Lake
White River
Hornepayne
Slate Islands
SCALE
0
25 mi.
0
20
40 km

Figure 4.5

PROPERTY LOCATION: Schreiber-Marathron Program 1986

■ MINE and/or PROPERTIES UNDER DEVELOPMENT

▲ PROSPECT

• OCCURRENCE

1. Empress Mine (Past - Producer)
2. Ferguson Occurrence
3. Fleck Resource Limited - Marathon Property
4. Gold Range Prospect
5. Harkness - Hays Prospect
6. Hays Lake Prospect
7. International Nickel Company Limited Prospect
8. International Wildrose Resources - McKellar Harbour Property
9. Johnston - McKenna Prospect
10. MacRae Occurrence
11. McKenna - McCann Prospect
12. Mogotherium Occurrence
13. Otisse Prospect
14. Violamac Prospect
15. Winston Lake Mine (Corporation Falconbridge Copper)

gold per ton and 118.88 ounces silver per ton. The mineralization occurs very sporadically throughout the veins, and further detailed work has been recommended for this area.

The Harkness-Hays—Hays Lake Area Exploration Model During 1986, an exploration model was developed for the Harkness-Hays—Hays Lake area, that is the culmination of the geological work performed during the past four years. The Harkness-Hays, Gold Range, Otisse, and Hays Lake Properties have a history of high grade quartz veins, hosted within shear zones. Assays of grab samples indicate values up to 25 ounces gold per ton (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). The four properties are located within an approximate 4 by 1 km area, and only minor production has been recorded from this area. The conceived exploration model suggests a regional approach, using structure and alteration as key parameters.

The general geology consists of felsic intrusive rocks of the Terrace Bay Batholith, in contact with predominantly mafic metavolcanics. In addition, minor felsic metavolcanics, tuff, iron formation, and late felsic to mafic intrusives are present. Sulphide and oxide iron formations are present on three of the four properties. They represent pauses in volcanism or sedimentation, and therefore occur at lithological contacts. Although assays from several of the iron formations indicate anomalous gold values (50 to 100 ppb), only the Ottisse and Harkness-Hays Properties have reported economic gold values.

The contact zone rocks have undergone amphibolite facies metamorphism, (hornblende-hornfels, Marmont (1984)), within a 300 to 500 m halo of the Terrace Bay Batholith. Recrystallization has destroyed many of the primary textures in the metavolcanics. Outside of this contact metamorphic aureole, the metavolcanics display greenschist facies metamorphism.

Airphoto interpretation and detailed mapping indicate a complex structural pattern in the Gold Range—Harkness-Hays area. A conjugate set of northeast- and northwest-trending faults dominate the area. The Gold Range Ridge represents a large (4 by 1.5 km) northeast-trending fracture zone, containing an intricate system of northeast-, east-, and northwest-trending faults and shears. This fracture zone is a section of the larger Schreiber Point-Worthington Bay Fault block, and is offset by a northwest-trending fault, herein named the Craft Lake-Lamont Lake Fault (Harcourt and Bartley 1939). The sense of motion is right-lateral or dextral. Several additional northwest-trending structures are evident in this area, including the Big Duck Creek Fault, Cook Lake Fault or Hollinger Lake-Von Lake Fault, and the Morley Fault (Harcourt and Bartley 1939). The intersection of a number of northeast- and northwest-trending structures occur in the Gold Range—Harkness-Hays Lake area.

Mineralization

In the Gold Range-Hays Lake area, gold mineralization is concentrated in quartz veins, composite veins, breccias, stockworks, and hydrothermally altered metavolcanics occurring predominantly within the metamorphic aureole of the Terrace Bay Batholith. Accessory metallic minerals include disseminated pyrite, chalcopyrite, sphalerite, galena, molybdenite, and tellurides. The mineralized zones strike predominantly to the northeast and to a lesser extent to the northwest, generally reflecting the main structures.

Hydrothermal alteration of the metavolcanics consists of sericitization (potassic enrichment), carbonatization, silicification, pyritization, and sodium depletion. Marmont (1984) describes a silicified-carbonatized rim near the veins and a potassic alteration zone on the periphery. Evidence for several mineralizing events is present, including a suggested relationship between late intrusives and the concentration of auriferous solution (Patterson *et al.* 1984, 1985). Outside of the metamorphic aureole in greenschist facies rocks, the hydrothermal alteration associated with auriferous veins consists of carbonatization and silicification. Anomalous gold values (50 to 100 ppb) have been reported from these altered rocks.

Exploration Targets

This exploration model proposes targets which are substantially larger in size and tonnage potential than the individual quartz veins explored by previous workers. The exploration program should concentrate on structurally related targets within the 300 to 500 m contact metamorphic aureole of the Terrace Bay Batholith. Northeast-, east-, and northwest-trending structures and their intersections, should be given particular attention.

1. The prime target is a northeast-trending block, 5 by 2 km in size, which extends from the Craft Lake-Lamont Lake Fault, north to the Hays Lake Property, that encompasses the Terrace Bay Batholith contact aureole.
2. Secondary targets include a northeast-trending block, 5 by 2 km in size, that includes the North Shore Mine and Morley Properties.
3. This exploration model may be extended to include an additional structural target, outside of the contact metamorphic aureole of the Terrace Bay Batholith. This target is discussed under Type 3 Mineralization below (*see* Johnston-McKenna—McKenna-McCann).

Proposed Exploration Program

The following exploration program is proposed for the Harkness-Hays—Hays Lake area:

1. ground acquisition, assessment search, and airphoto interpretation
2. linecutting, to establish control due to rugged terrain
3. prospecting, to locate previous showings, and discover any additional ones
4. Geological and Structural Mapping, to define the lithological units, metamorphic aureole, alteration zones, and fault and shear zones. Mapping should concentrate on northeast-, east-, and northwest-trending structures

5. geophysical surveys
    a) an induced polarization survey, to define areas of disseminated sulphide mineralization. Alteration zones commonly contain fine-grained disseminated pyrite. Veins, composite veins, breccias, and shear zones could be identified
    b) VLF electromagnetometer (2-Directional) and magnetometer surveys, to define iron formations, lithological contacts, faults, and shear zones. The VLF survey should include two stations due to the conjugate fault set, and corrections due to topography
6. geochemical surveys
    a) a lithogeochemical survey would help define hydrothermal alteration zones. The survey should concentrate on potassium, sodium, silica, calcium, carbon dioxide and total iron
    b) a soil geochemical survey, concentrating on such elements as gold, copper, and molybdenum, to help define mineralized structures and drill targets
7. stripping, trenching, and sampling to expose surface expressions of geochemical and geophysical anomalies, as well as new showings discovered by prospecting. Lengths, widths, and grade of these zones could be determined.
8. diamond drilling, to test for vertical extension of the mineralized zones, and to test structural, geochemical, and geophysical targets

The above suggested exploration program summarizes a systematic, detailed regional approach to the Harkness-Hays—Gold Range-Hays Lake area. Variations in such a program are likely to occur.

TYPE 3: METAVOLCANIC HOSTED-DILATANT ZONE TYPE

Gold mineralization occurs in quartz and carbonate veins within shear zones, fractures, and cleavage dilation zones in predominantly mafic metavolcanics. This mineralization type is described in detail by Schnieders and Speed *in* Patterson *et al.* (1984, 1985).

Johnston-McKenna—McKenna-McCann Area The Johnston-McKenna and McKenna-McCann area is a fault bounded, rectangular area approximately 4 by 2 km in size. Numerous northeast-trending faults, shear zones, and lineaments have been identified by Harcourt and Bartley (1939). The geology and mineralization of these properties is described by Schnieders and Speed *in* Patterson *et al.* (1985). The faults bounding the area consist of the Cook Lake Fault (Hollinger-Von Lake Fault), Craft Lake-Lamont Lake Fault, and Big Duck Creek Fault, previously described under Type 1 mineralization (*see* above). In addition, abundant northeast-trending faults are present in the area, including the Schreiber Point Fault and Worthington Bay Fault. Work performed during 1986 suggests that a conjugate fault set is present in this area.

Ramsay (1980) describes ductile shear zones which occur in conjugate sets, one with a right-handed displacement (right-lateral or dextral), the second with left-handed displacement (left-lateral or sinistral). This feature is observed on both the McKenna-McCann and Johnston-McKenna Properties. Vein systems and shear zones strike predominantly to the northwest, and to a lesser extent to the northeast. Displacement along the northeast-trending shear zones occurs in a right-lateral sense, while displacement along the northwest structures appears to be left-lateral. Detailed examinations suggest that the northeast-trending faults or shear zones offset the northwest-trending veins (Harcourt and Bartley 1939), and are interpreted as being later.

Quartz veins provide interesting and valuable information when considering the structural setting of the area. Northwest-oriented quartz veins are commonly narrow, lenticular, and *en echelon* in style, and consist of a crack-seal or ribbon texture. The northeast-trending veins are commonly wider than the northwest-trending veins, and contain brecciated, vuggy, cockscomb textured quartz. The northwest-oriented veins may reflect a more ductile deformation, while the northeast-striking veins might represent a more brittle deformation. Numerous generations of quartz, likely related to a polyphase mineralization history, is evident, especially in the northwest-striking veins. One suggestion is that the northeast-oriented vein set represents an extensional feature, possibly reactivated during later deformational episodes. Both vein systems contain gold mineralization, however, the northeast vein set appears to contain more sporadic gold concentrations. Recent prospecting and exploration in this area has discovered additional mineralized veins. Further detailed structural and analytical work is scheduled for this area.

BASE METALS

Type 1: Volcanogenic Massive Sulphide Deposits

This type of mineralization is introduced and described by Schnieders and Speed *in* Patterson *et al.* (1984, 1985, 1986) and includes the Winston Lake Deposit and the McKellar Harbour Property.

Production at Corporation Falconbridge Copper's Winston Lake Mine is slated for early 1988 (The Northern Miner, November 10, 1986). Probable and possible reserves reported indicate 3.4 million tons, grading 16 percent zinc, 1 percent copper, 0.96 ounce silver per ton, and 0.03 ounce gold per ton (The Northern Miner, November 10, 1986, p.1).

International Wildrose Resources-McKellar Harbour Property The McKellar Harbour Property of International Wildrose Resources Limited is located in the Prairie Cove-Prince Point-Fitzsimmons Rocks-McKellar Harbour area, approximately 30 km west of Marathon, and along the northern shore of Lake Superior (Walker 1967).

The general geology consists of predominantly mafic metavolcanics, mafic intrusive rocks, intercalated felsic fragmental rocks, and iron formation. Late felsic and mafic dikes intrude the metavolcanics. Mafic metavolcanics occur on the Prince Point shore, while metavolcanics of felsic composition with minor intercalated mafic metavolcanic flows occur predominantly on the Fitzsimmons Rocks. Felsic fragmental rocks, several hundreds of metres in width, were observed, possibly suggesting the presence of an ancient volcanic vent in the area. Two volcanic cycles are presumed; however, younging indicators were not readily identifiable.

The felsic metavolcanics consist of a monolithic, clast supported, fragmental unit. The matrix varies from felsic to mafic in composition. Felsic fragments displaying porphyritic textures and up to 1 m in length were observed; however, the fragments average 5 to 20 cm in size. Numerous fragments display stretched or tear-shaped terminations, suggesting that these fragments have undergone deformation. A well developed cleavage, oriented subparallel to the long axis of the fragments, strikes 076°. Potassic alteration of the felsic fragments was observed in one location. This alteration is presumed to be related to the intrusion of a felsic dike, likely associated with the Coldwell Alkaline Complex.

Sulphide mineralization was observed in the matrix of the felsic fragmental unit, and appears to be oriented along the cleavage. Near massive pyrite and pyrrhotite mineralization was observed in several mineralized pods, the largest being 1 by 0.5 m.

The mafic metavolcanics include pillowed and massive flow rocks, as well as tuffaceous units. An oxide facies iron formation was observed in the Prince Point area, at the contact between a mafic, pillowed metavolcanic unit and a mafic intrusive rock. Whether the mafic intrusive unit represents a coarse-grained flow, feeder dike, or late intrusion was not determined. The oxide iron formation consists predominantly of laminated magnetite and chert, recrystallized chert, and silicate and carbonate minerals. Sulphide minerals include pyrite, pyrrhotite, and sphalerite. The iron formation varies in width from I m to a composite zone 3 m in width. The unit strikes 260° and dips 85°N, and was followed along strike for up to 2 km. Isoclinal folding is evident within the iron formation, with one fold axis trending 094° and plunging 64°. The facies of the iron formation varies along strike, from oxide facies, to a facies richer in sulphide mineralization, to possibly a carbonate facies.

Analyses of sulphide mineralization from the felsic fragmental unit indicated 560 ppb gold, and 9 ppm silver. Analyses of grab samples from various locations along the iron formation indicated values up to I360 ppb gold, 3 ppm silver, 815 ppm copper, 800 ppm arsenic, and 1.08 percent zinc.

PLATINUM GROUP ELEMENTS (PGE)

Exploration activity for the platinum group elements (PGE) attained an elevated level during 1986. Prospecting, as well as the re-examination of previously discovered occurrences, has led to the discovery of several new PGE occurrences. Exploration programs ranging from "grass roots" to the prefeasibility level, are ongoing in the Marathon area.

This increase in PGE exploration has led to a preliminary classification of several occurrence types.

Coldwell Alkalic Complex Type

Centre 1: Eastern or Border Gabbro Type Copper mineralization, minor nickel mineralization and platinum group elements are associated with mafic intrusive rocks of the Coldwell Alkalic Complex. The eastern (Currie 1980) or border (Franklin *et al.* 1982) gabbro is described as a crescentic mass, around the eastern side of the intrusion. The mafic rock is described as an amphibole-rich brownish black rock which varies in grain size and texture. The varieties of gabbro are intermixed with one another, with coarse pegmatitic veins and schlieren of white syenitic material present. The main mineral constituents of the gabbroic rock include labradoritic plagioclase and clinopyroxene, olivine, biotite, magnetite, ilmenomagnetite, sulphide minerals and apatite (Currie 1980).

Smyk and Watkinson (Carleton University, Ottawa, personal communication, 1986; Watkinson *et al.* 1983) suggest that primary sulphide and PGM crystallization from gabbroic magma was not the single process of ore genesis. An ore genesis model which includes secondary enrichment and mobilization, and possibly deuteric alteration is proposed. Copper and PGE, with minor amounts of silver, gold, cobalt, and nickel, occur in sulphide-rich zones within the gabbroic rocks.

Examples of the Eastern Gabbro Type include the Fleck Resources Limited-Marathon Property, Thor Lake Property, Parlake Property and Three Finger Lake Property.

FLECK RESOURCES LIMITED–MARATHON PROPERTY

The Fleck Resources Limited-Marathon Property is about 3000 acres in size, with the main mineralization zones located approximately 10 km northeast of Marathon.

In 1984, Fleck Resources Limited acquired the Marathon Property from Anaconda Canada Explorations Limited. During the 1960s, Anaconda completed 119 000 feet (36 271 m) of drilling and outlined a drill indicated reserve of 34 400 000 tons of 0.039 ounce platinum/palladium per ton and 0.47 percent copper, with additional values of gold, silver, rhodium, nickel, and cobalt (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

The general geology consists of eastern gabbroic rocks related to Centre 1 of the Coldwell Alkalic Complex, flanked to the north and east by Archean metavolcanic, metasedimentary, and granitic rocks. The gabbro is generally fine grained, and consists of layered and massive varieties. Coarse-grained pegmatitic gabbro is observed intermixed with the fine-grained gabbro, and as cross-cutting dikes and veins oriented along a north-trending structure (D. Watkinson, Professor, Carleton University, Ottawa, personal communication, 1986). Inclusions of metavolcanic within the gabbro are a common feature in the Fleck Resources Limited-Marathon Property area.

The fine-grained gabbro consists of labradoritic plagioclase and clinopyroxene, with subsidiary and variable amounts of olivine, biotite, magnetite, ilmenomagnetite, sulphide minerals, and apatite (Currie 1980).

Copper, platinum group elements (PGE) and minor amounts of silver, gold, cobalt, and nickel occur in sulphide-rich zones in variably altered gabbroic rocks. The fine-grained gabbro hosts disseminated sulphide mineralization, while the coarse-grained, deuterically altered gabbro contains interstitial, multicomponent aggregates of sulphides (M. Smyk and D. Watkinson, Carleton University, Ottawa, personal communication, 1986). Sulphide concentrations within the gabbro are generally low, commonly less than 5 percent. The coarse-grained gabbro-sulphide association appears to represent an economically significant feature.

Sulphide mineralization which has a high concentration of chalcopyrite is PGE-rich, and is intimately associated with chlorite, calcite, biotite, magnetite, apatite, and hornblende. It is further suggested that these replacement sulphide and mineral assemblages are related to the development of late-stage fluids, which remobilized, reconcentrated, and precipitated PGE and other metals, which were derived from primary magmatic sulphides (D. Watkinson and M. Smyk, Carleton University, Ottawa, personal communication, 1986).

During 1985 and 1986, Fleck Resources Limited conducted re-assaying, stripping, trenching, channel and bulk-sampling, diamond drilling, and metallurgical tests. Both grades and tonnages of the deposit were substantially increased due to these programs (J. McGoran, President, Fleck Resources Limited, Vancouver, personal communication, 1986).

Centre 2: Alkalic-Biotite Gabbro Type Copper and platinum group elements (PGE) are hosted within gabbroic rocks related to the Centre 2 intrusion of the Coldwell Alkalic Complex. Currie (1980) describes one or more outer rings of strongly alkalic gabbro, partially broken and assimilated by cone sheets of syenite and nepheline syenite.

Mitchell and Platt (*in* Franklin *et al.* 1982) describe the biotite gabbro as the earliest representative of Centre 2. Abundant metavolcanic xenoliths are partially assimilated and altered within the gabbro. It is generally fine grained, however, variations in grain size have been observed. The gabbro is composed of biotite, olivine, plagioclase, pyroxene, amphibole, nepheline with significant accumulations of magnetite, and apatite.

Intensely metasomatized and reconstituted country rocks are intercalated with the alkalic gabbros in the central area of the Coldwell Alkalic Complex. A large north-trending lineament is present in this area from Red Sucker Cove to Coubran Lake (R. Mitchell, Professor, Lakehead University, Thunder Bay, personal communication, 1986). This lineament appears to reflect a fault or deformation zone, as numerous xenoliths, and brecciated and mixing zones are present. While the exact implications of this north-trending structure are unknown, it appears to have had a role in the mineralization history.

PGE occur within sulphide horizons hosted by the alkalic or biotite gabbro. Sulphide minerals include chalcopyrite, bornite, chalcocite, pyrite, and pyrrhotite. Additional oxides include magnetite, ilmenomagnetite, malachite, and azurite. An association between copper-rich-sulphide assemblages and PGE is suggested. An example of the Centre 2 Alkalic-Biotite Gabbro Type is the MacRae Occurrence.

MacRAE OCCURRENCE

The MacRae Occurrence is located near the centre of the Coldwell Alkalic Complex, approximately 15 km northwest of the township of Marathon. The mineralized zone is located 1.5 km south of the southern tip of Coubran Lake.

The area was previously explored in 1963 and 1964 by Ameranium Mines Limited, who conducted linecutting, geological mapping, and geophysical surveys. Sampling indicated the presence of copper and titanium mineralization. Trenching in the area of the MacRae Occurrence indicated analytical values up to 1 percent copper (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

In 1986, a group of prospectors from Marathon rediscovered the Ameranium copper-titanium trench, and the presence of platinum group elements (PGE). With assistance from the Ministry of Northern Development and Mines, several mineralized showings were discovered. The MacRae Occurrence presently consists of several showings, including the MacRae, Joa, and Mathias showings.

The general geology consists of gabbroic rocks of Centre 2 in contact with a medium-grained syenite. The gabbroic rock varies from being fine to coarse grained, including magnetite-rich coarse-grained units. While no distinct layering was evident, a modal variation was observed within the gabbroic rocks. The gabbroic rocks appear to intrude the syenite, and display a chill zone and hybrid phase at the contact with the syenite. A north-striking lineament is observed in this area.

The mineralogy of the gabbroic rock consists of plagioclase (oligoclase), clinopyroxene, amphibole, magnetite, and apatite. The plagioclase is ophitic in texture. An altered version of the gabbroic rock displays exsolved magnetite (after olivine), amphibole, sodic feldspar, tremolite, actinolite, chlorite, pyroxene, and apatite, as well as the presence of sulphide mineralization (R.H. Mitchell, Professor, Lakehead University, Thunder Bay, personal communication, 1986).

Mineralization is present within a north-striking zone, which is estimated to be 900 m in length and varying in width from 5 to 40 m. Disseminated chalcopyrite, bornite, and chalcocite with minor pyrite and pyrrhotite are present within the gabbroic rock. The sulphide content is generally less than 5 percent. Native copper has been identified in one location in the field. In several areas, a magnetite-rich gabbroic rock is present, with coarse-grained magnetite constituting 40 percent of the rock.

Sulphide mineralization also occurs within the hybrid contact zone, subparallel to the gabbro-syenite contact. This contact may have focused a north-trending fault, as evident from aerial photographs. West-northwest-trending faults appear to have offset the mineralized zone in a sinistral sense.

At the Mathias showing, several chalcopyrite-bornite-magnetite-rich stringers occupying fractures are hosted in a sulphide-rich, fine- to medium grained gabbroic rock. Near massive chalcopyrite, containing bornite and/or chalcocite and magnetite crystals, was observed. The gabbroic rock hosting these fractures is mineralized with bornite, chalcocite, and chalcopyrite, and displays evidence of potassic alteration. The largest fracture or mineralized pod observed is up to 10 cm in width and less than 1 m in length. A secondary enrichment and reconcentration of copper, magnetite, and PGE is proposed in this area. The Mathias showing is close to the intersection of the proposed northwest-trending fault, and a north-trending structure.

Analyses of selected grab samples indicate values up to 1.73 percent copper, 394 ppm nickel, 110 ppb platinum, 2130 ppb palladium, 220 ppb gold, and 7 ppm silver from the gabbroic rock with disseminated sulphide mineralization, and up to 32.3 percent copper, 1050 ppm nickel, 4250 ppb platinum, 2775 ppb palladium, 1080 ppb gold, and 112 ppm silver from the chalcopyrite-bornite-magnetite-rich stringers and pods. The MacRae Occurrence has been optioned by St. Joe Canada Incorporated.

Additional PGE Occurrence Types

In addition to the Coldwell Alkaline Complex Types, a classification for base metals and PGE related to the Killala Lake Alkalic Complex is likely in the future. Occurrences such as the Baseline, Drainage Lake, Sandspit, and Popover should be investigated for PGE.

Another occurrence type is represented by PGE which is related to copper-nickel sulphide mineralization hosted by Archean mafic and ultramafic intrusions. Examples of potential occurrences include the International Nickel and Violamac Occurrences within the Goodchild Lake ultrabasic unit (Figure 4.5; Milne 1966) and the Nicopar Occurrence located north of Schreiber (Figure 4.5).

EXPLORATION GUIDELINES

Gold and Base Metals

Exploration guidelines for gold and base metals are described by Schnieders and Speed *in* Patterson *et al.* (1984, 1985, 1986) and an exploration model for the Harkness-Hays—Gold Range area has been discussed above. In addition, the Victoria Lake-Lynn Lake area is recommended. Noranda Incorporated, in a joint venture with Cumberland Resources Incorporated, has identified anomalous base metal values within altered felsic metavolcanics.

Platinum Group Elements (PGE)

Exploration for PGE in the Schreiber-Marathon area should concentrate on the following parameters:

1. mafic to ultramafic intrusive rocks of Proterozoic to Archean age
2. disseminated sulphide mineralization within the mafic to ultramafic intrusive rocks (generally less than 5 percent is sufficient). Copper-rich sulphide concentrations are enriched in PGE in several areas within the Coldwell Alkalic Complex
3. mafic or ultramafic rocks which display variations in grain size, modal layering disrupted layering, intermixing of magma types, magmatic-related breccias, and pegmatitic dikes or veins should be thoroughly prospected and sampled for PGE

Recommended areas for prospecting and exploration of PGE include:

1. Coldwell Alkalic Complex, Centre 1 (Eastern-Border) and Centre 2 (Alkalic-Biotite) Gabbros
2. Killala Lake Alkalic Complex
3. Goodchild Lake Mafic to Ultramafic Intrusive (Extrusive)?
4. Rhea Lake-Hornblende Lake Gabbro (Nicopar Occurrence)
5. Owl Lake-Cairngorm Lake-Little Davidson Lake area; a reference to samples of pyrrhotite collected from north of the Ursa Major Mine indicated values for platinum "around one hundred dollars a ton" in 1903 (Downey 1985).

RECENT EXPLORATION ACTIVITIES

Corporation Falconbridge Copper continued the development of its Winston Lake Deposit (Figure 4.5) located approximately 30 km northwest of Schreiber. Presently development includes the transportation and reconstruction of a 1200 to 1400 ton mill from Sturgeon Lake, on the Winston Lake site. Road construction and improvement of the 20 km Winston Lake road is completed and production at the mine is scheduled for late 1987 or early 1988. Exploration in the Winston Lake and Big Duck Lake areas is continuing.

Noranda Incorporated has made an agreement with Cumberland Resources Limited on their Victoria Lake base metals property. The property is reported to display hydrothermal alteration similar to that reported at Winston Lake (The Northern Miner, July 21, 1986, p.3). Exploration programs during 1986 included linecutting and geological mapping, with a Pulse EM geophysical survey scheduled for late 1986 or early 1987.

Fleck Resources Limited, working on their Marathon copper-PGE property, conducted stripping, trenching, bulk sampling, channel sampling, detailed geological mapping, resampling and analyses of previous drilling, diamond drilling, metallurgical testing, and feasibility studies.

Kingdom Resources Limited conducted diamond drilling on their Steel River Property south of Tuuri Township. The drilling program was a follow-up to the geochemical and geophysical programs conducted in 1983 and 1984.

Zenmac Zinc Limited has made an agreement with Eldor Resources Limited on their Tuuri Township Property (Bozena Lake Occurrence). Eldor Resources Limited have completed geological mapping, trenching, geochemical and geophysical surveys, and a diamond drilling program to 1986.

Lincoln Resources Incorporated conducted geophysical surveys and diamond drilling on the Morley Property.

PatMikko Resources Limited conducted trenching, stripping, sampling, and mill construction and installation on the Johnston-McKenna Property. Minor bulk sampling and metallurgical testing was performed in 1986.

International Wildrose Resources Limited conducted prospecting, geological mapping, stripping, trenching, sampling, and geophysical surveys on their McKellar Harbour Property. A diamond drilling program is scheduled in 1987.

Jim Kraehling of Terrace Bay conducted bulk sampling on the McKenna-McCann Property, located within the Schreiber Township limits. Approximately 45 tons of material was transported to the Canadian Concentrators Limited mill in Thunder Bay.

ATIKOKAN COBALT–BASE METALS–PGE PROJECT by A.D. Mactavish and R.J.A. Dutka

INTRODUCTION

The Atikokan Cobalt-Base Metals-Platinum Group Elements (PGE) Project is presently in the final year of a proposed three-year program that began in May of 1984. The project is staffed by Allan MacTavish and Rick Dutka, Resource Geologists. The objectives of the program are to stimulate exploration activity as described by MacTavish and Dutka *in* Patterson *et al.* (1986).

Field work, consisting of detailed and reconnaissance mapping and sampling, is now complete and data interpretation and the drafting of a final report is presently underway. The specific focus of this project has been to examine the copper-nickel-platinum-palladium-(gold)-rich Quetico Intrusions and the iron-copper-nickel-cobalt-rich Atikokan River Intrusions. Numerous other base metal and gold occurrences have also been examined but not in as detailed a manner. Eight occurrences, of various types, have been mapped in detail since 1984. Two were mapped this year: the Kawene Intrusion and the Kroocmo Occurrence. For descriptions of mapping done previously *see* MacTavish and Dutka *in* Patterson *et al.* (1985 and 1986). Also examined in 1986 were two copper-nickel-platinum-palladium occurrences and three gold-base metal occurrences.

Several informal and highly varied field trips were conducted at the request of interested parties and individuals from the Ontario Geological Survey, the Geological Survey of Canada, the National Aeronautics and Space Administration (NASA), private industry, and Lakehead University.

As an added responsibility the project has been handling any inquiries or property visit requests for the Lac des Iles area. Inquiries and consultations regarding the platinum-group elements have greatly increased in 1986. Approximately 97 of the more than 245 platinum-group inquiries were specifically related to the Lac des Iles area. Two properties were visited and project staff participated in, or co-led, three field trips to the area.

This report will deal with not only the Atikokan Cobalt-Base Metals-PGE Project, but will also describe some of the gold activity in the Atikokan area and the exploration activity in the Lac des Iles area. All analyses quoted in the text of this report, unless otherwise noted, were done by the Geoscience Laboratories, Ontario Geological Survey, Toronto.

GENERAL GEOLOGY AND STRUCTURE

The project area lies within the southern part of the Superior Province of the Canadian Precambrian Shield. It encompasses parts of the southern Wabigoon and the northern Quetico Subprovinces and straddles the Quetico Fault Zone. A complete description of the general geology and structure is presented by MacTavish and Dutka *in* Patterson *et al.* (1985).

DEPOSIT TYPES

The presence of five deposit types that might host base metal, cobalt, or platinum-group element mineralization was previously outlined by MacTavish and Dutka *in* Patterson *et al.* (1985 and 1986). These five deposit types are:

1. the Atikokan River Intrusions
2. the Quetico Intrusions
3. chemical metasediments
4. shear zones
5. quartz veins

A short description of each of the deposit types is presented below with a short description of the 1986 detailed mapping program.

1. The Atikokan River Intrusions

The Quetico Fault Zone, where it forms the Atikokan River valley west of Crooked Pine Lake, is host to six exposed syntectonic mafic to ultramafic "intrusions". These bodies form erosion-resistant, steepsided, dike-like ridges composed of altered hornblende melagabbro to highly amphibolitized pyroxenite. The rocks are heavily faulted and pervasively sheared with shear intensity decreasing toward the centre of each intrusion. In all cases the original rock textures are destroyed near the contact with the enclosing Quetico Fault Zone.

Mineralization consists of fault bound blocks and lenses of massive to semimassive magnetite and closely associated lenses and zones of disseminated, locally net-textured, sometimes semimassive to massive pyrite, pyrrhotite, and chalcopyrite. One to ten percent disseminated pyrrhotite, chalcopyrite, and pyrite are ubiquitous within the massive magnetite. Sulphide mineralization is also always present within the altered silicates and can constitute up to 5 percent of the rock. In all intrusions the subsequent shearing has remobilized much of the sulphide mineralization. The intrusions that host the past-producing Atikokan Iron Mine, the Shepherd Prospect, and the Pattison-Roberts Prospect were mapped and sampled in detail during the 1985 field season and are described by MacTavish and Dutka *in* Patterson *et al.* (1986).

2. The Quetico Intrusions

The Quetico Intrusions are a series of small, mafic to ultramafic dikes, sills, plugs, and stocks that have syntectonically intruded into the thin remnant metaturbidite belt comprising the northern Quetico Subprovince. These intrusions are usually less than l km in diameter, and occur within a 95 km long zone between McOuat Lake in the west and Lac des Mille Lacs in the east.

The larger Quetico Intrusions generally form elongated plugs or roughly circular stocks, usually composed of feldspathic hornblendite, hornblendite, hornblende pyroxenite, sometimes hornblende-rich wehrlite, and occasionally hornblende gabbro. They tend to be multiphased and can exhibit a very rough zonation of rock types. In this instance the calcium- and magnesium-rich rocks, such as hornblende clinopyroxenites and hornblende wehrlites, occupy the core areas and the more evolved hornblendites and gabbros surround the cores as a series of successive but discontinuous shells. The smaller Quetico Intrusions tend to be dike-like and are usually composed of massive and sometimes layered hornblendite, feldspathic hornblendite, and hornblende gabbro. Textures throughout all of the intrusions are highly variable and range from fine to very coarse grained to pegmatitic. Modal and textural layering have been observed locally.

Sulphide mineralization consists of less than 1 to 20 percent very finely disseminated to locally blebby and net textured chalcopyrite, pyrrhotite, and pyrite. The sulphide zones are typically composed of coarse pyrrhotite grains rimmed by chalcopyrite within highly altered medium- to very coarse-grained silicates with local pegmatitic patches and veins. Platinum-group element mineralization occurs in zones of less than 10 percent disseminated to blebby copper-nickel sulphides that occur near internal contacts or the borders of the intrusions.

Thirteen of the fifteen known intrusions have been examined and detailed mapping has been completed on the Mud Lake, the Abiwin, and the Kawene Intrusions. The Mud Lake and the Abiwin Intrusions were described by MacTavish and Dutka *in* Patterson *et al.* (1986). The Kawene Intrusion was mapped in 1986 and is described below.

The Kawene Intrusion The Kawene Intrusion is an elongated east-west-trending plug-like body approximately 525 m in length and up to 190 m in width. It is located 500 m west of Kawene Lake, 500 m north of the CNR tracks, 27 km east of Atikokan, and straddles the boundary between Hutchinson and Trottier Townships.

The intrusion is composed of moderately to highly altered, fine- to coarse-grained, greyish green to dark green, oikocrystic usually hornblende-rich pyroxenite and altered, fine- to medium-grained, oikocrystic hornblende peridotite, possibly wehrlite. Hornblendite, feldspathic hornblendite and minor melagabbro occur locally in the southwestern portion of the intrusion. Local, irregular, plagioclase, and skeletal hornblende-rich patches are common near the external contacts throughout the intrusion. The presence of the large, euhedral, skeletal hornblende crystals might indicate that an immiscible plagioclase-rich liquid was present during emplacement. Thin gabbro pegmatite patches and veins occur locally near contacts and within the mineralized zones.

The contact with the metasedimentary country rocks is sharp, but undulatory, and is commonly offset, 3 to 15 m, by numerous small-scale dextral faults. A significant contact metamorphic aureole is absent. The thin aureole that is observed is never more that 2 or 3 m in width and is noticeable only as a slightly darker coloured zone with little or no schistosity and no remnant primary sedimentary features. The width of the aureole might indicate that the country rocks were hot, but very dry, at the time of intrusion. Minor assimilation of the country rock by the magma is indicated at the contact by the presence of a thin, 30 to 100 cm wide, plagioclase-rich zone. The plagioclase content quickly decreases away from the contact.

Very finely disseminated, PGE-poor pyrrhotite and chalcopyrite, in amounts of much less than 1 percent to approximately 3 percent are common in the fine- to medium-grained rocks throughout the intrusion. Significant platinum and palladium are detected only in an irregular, elongated zone, approximately 100 m in length and 25 m in width, near the north-central contact. This zone contains between 2 and 25 percent disseminated to blebby to locally net-textured pyrrhotite, chalcopyrite, pentlandite, and pyrite. The sulphide blebs are commonly composed of pyrrhotite rimmed with chalcopyrite. The mineralization roughly straddles an undulatory, possibly disrupted, contact between a 5 to 10 m thick unit of fine- to medium-grained, competent, pyroxenite and a very coarse grained, highly altered, hornblende pyroxenite. Analytical values obtained from the main mineralized zone range from 780 ppm to 1.26% copper, 485 to 2480 ppm nickel, 43 to 410 ppm cobalt, 130 to 1200 ppb palladium, 135 to 1100 ppb platinum, 5 to 10 ppb rhodium, and 5 to 460 ppb gold.

3. Chemical Metasediments

Base metal-bearing chemical metasediments were observed and examined only in the Finlayson Lake area. Finlayson Lake is situated about 10 km northwest of Atikokan and l km west of Marmion Lake. Fenwick (1976) outlined two basic types of chemical metasediments in this area. All of these rocks appear to have formed in a reducing environment and can probably be classed as "sulphide-facies iron formation".

"Type 1" rocks range from 10 cm to 5 m in thickness, are slightly to highly folded, and are associated with felsic to mafic metavolcanics and clastic sedimentary rocks. Rocks of this type tend to be well banded with alternating white to grey recrystallized, sugary-textured chert and iron-rich laminae usually composed of massive to laminated pyrrhotite, nodular pyrite, and minor blebby chalcopyrite. Magnetite, hematite, and iron silicates are observed locally. Pyrite, which is present in subordinate amounts compared to pyrrhotite, usually occurs as radial or concentric nodules up to 10 cm in diameter within the iron-rich laminae and along fractures and joints. Chalcopyrite is a relatively minor constituent everywhere, except at the Fin-Lan Copper Mines Occurrence, and it is usually associated with remobilized quartz blebs within massive pyrrhotite. Graphitic zones are observed locally.

"Type 2" chemical metasediments exhibit many of the same characteristics as the "Type 1" rocks; however, they tend to be associated with felsic pyroclastic rocks, and intertuff graphitic argillite and shale. They contain more pyrite than pyrrhotite.

Detailed mapping and sampling were done on the small occurrences in the Finlayson Lake area. The only significant analytical results were obtained from the "Type 1" Fin-Lan Copper Mines Occurrence. The values ranged from 515 ppm to 1.18% copper, 1260 to 3720 ppm zinc, and 280 to 990 ppm cobalt (about 2 pounds per ton).

4. Shear Zones

Shear zones are very common in the Atikokan area and are usually associated with, or a direct result of, faults that splay from the Quetico Fault Zone or other major faults and lineaments. Most of the shear zones contain low percentages of very finely disseminated pyrite, but do not contain base metal- or cobalt-rich minerals.

Cobalt, gold, and copper are sometimes contained in the highly sheared and deformed zones within the mafic metavolcanics that occur just to the north of the Quetico Fault Zone. These shear zones are characterized by very limonitic, carbonate-chlorite-(fuchsite) schists that contain highly deformed quartz, quartz-carbonate, and carbonate veins and stringers. Sulphide mineralization is variable but is usually restricted to pyrite and some minor chalcopyrite. Erythrite is observed locally along shear and fracture surfaces and represents the weathering product of base metal- or cobalt-rich minerals.

Minor base metal sulphides have been observed in the rusty weathered, quartz-sericite, carbonate-chlorite-sericite, and chlorite schists that characterize the shear zones in the Finlayson Lake area. This mineralization consists primarily of variable amounts (1 to 20 percent) of finely disseminated and stringer pyrite, pyrrhotite, and minor chalcopyrite.

Base-metal sulphides have also been observed in a major shear zone in the Lumby Lake area, approximately 40 km northeast of Atikokan. This shear zone is 10 to 15 m in width and extends, in an east-west direction for 25 or 30 km between Redpaint and Oldman Lakes. It contains numerous boudinaged quartz veins and stringers and is variably composed of carbonate-sericite-quartz schist or carbonate-chlorite-sericite schists. The original country rocks were once interbedded felsic and mafic metavolcanics and quartz-porphyry sills. Mineralization generally consists of less than 3 percent finely disseminated pyrite with local concentrations of sphalerite, chalcopyrite, and pyrite.

5. Quartz Veins

Base-metal sulphides commonly occur within quartz veins, especially those that are auriferous. Mineralization consists primarily of chalcopyrite, sphalerite, and galena, either associated with pyrite, sericite or chlorite along the "slip-planes" of crack-seal type veins, or as isolated grains, blebs, or massive lenses within the main body of a vein. Some base metal values obtained from quartz veins have ranged from 710 to 4600 ppm copper, 430 to 2720 ppm lead, and 1290 to 4450 ppm zinc.

PROPERTY VISITS—GOLD OCCURRENCES

Lynx Head Occurrence

The Lynx Head Occurrence is located on claim 659897 southwest of Trap Bay on Marmion Lake. Recent prospecting has led to the rediscovery of several of the old workings on the property. Two shafts and one exploration trench are located on a small island in the Lynx Head Narrows area, and one 15 m vertical shaft is located on the mainland, approximately 150 m northwest of the island. This property has been previously documented as the "Bates Occurrence" (Coleman 1897; Fenwick 1976; Schnieders and Dutka 1985), however, previous field parties were unable to locate this showing, because during high water conditions much of the dump piles and shafts located on the island would have been submerged. Due to the extremely low water level on Marmion Lake this fall the old workings were exposed.

The geology of the area consists of a complex mixture of Marmion Lake Batholith rocks, including trondhjemite gneiss, massive tonalite, chlorite-carbonate schists (sheared mafic dike), and assimilated metavolcanic xenoliths.

At least two generations of quartz veining were observed. Early exploration focused on the main veins, which vary in width from 1 to 2 m, strike about 085° and have a gentle dip of 25° to 30° to the south. The quartz ranges from a glassy, white variety to an iron-stained, rosy variety. Mineralization in the veins consists of 1 to 15 percent coarse-grained pyrite cubes (up to 1 cm in diameter) that occur as disseminated crystals or in small masses. The pyrite is pale in colour and hematite alteration of the pyrite was noted in several veins. Minor accessory minerals include chalcopyrite, galena, hematite, and molybdenite. A later, possibly shear zone-controlled vein system crosscuts the shallow dipping veins. The veins of this later system range in width from 10 to 15 cm. They strike 110° to 135°, dip southwest 75° to 80°, and are composed of glassy, white quartz mineralized with 1 to 3 percent disseminated pyrite. A similar geological setting is observed at the Hammond Reef Mine, 3 km to the north.

Recent trenching has exposed several well-mineralized shallow dipping quartz veins on the island. Assay results from grab samples collected from both the old and new workings range from 0.01 to 1.20 ounces of gold per ton.

Stewart-Sande Occurrence

The Stewart-Sande Occurrence is located on claim TB875440 due west of Trap Bay on Marmion Lake. Recent prospecting has discovered a mineralized breccia zone.

Geological traverses in the immediate area of the occurrence has identified at least two distinct rock types. Outcrops observed south of the occurrence consist of an altered, gneissic-textured trondhjemite containing assimilated metavolcanic xenoliths and mafic dikes, (possibly representing the older core of the Marmion Lake Batholith), while outcrops observed north of the occurrence consist of a more massive, relatively unaltered trondhjemite/tonalite. As the breccia zone is approached, pronounced alteration, consisting of pyritization, sericitization, chloritization, and hematization, is evident. Within the breccia zone, alteration and weathering becomes quite intense, producing a gossan coating which easily identifies the main mineralized zone.

The breccia zone consists of angular fragments of trondhjemite mineralized with fine- to coarse-grained pyrite in a sericite-chlorite-pyrite matrix. The zone strikes 110° to 120° and dips 55° to 60° south. It has been traced for over 120 m along strike with widths ranging from 5 to 10 m. Economic grade gold assay values have been obtained from chip samples collected across the zone at various locations along strike.

Regional structural trends show that this newly discovered breccia zone occurs between two converging northeast lineaments. Structural fabrics observed within the breccia zone show evidence of both brittle and ductile deformation. Cataclasite textures, such as angular fragments which have been fractured and rotated, were noted in polished hand specimens. As well, several fragments exhibit a well developed foliated fabric which indicates ductile deformation. It is quite possible that the ductile part of the deformation history formed at a different time from that of the fault discontinuity.

Past exploration for gold within the Marmion Lake Batholith has been focused on mineralized, structurally-controlled quartz veins. The discovery of this mineralized breccia zone has defined a new style of gold mineralization for the Marmion Lake Batholith and offers great potential for future exploration targets.

Kroocmo Occurrence

The Kroocmo Occurrence is located approximately 32 km west of Atikokan and 1 km north of Gehl Lake. Recent overburden stripping has exposed a highly deformed sequence of mafic to felsic metavolcanics which have been intruded by a series of small tonalite stocks. Detailed mapping has revealed that a large transported tectonic slice of Seine Series metasediments exists in fault contact with mafic metavolcanics.

The Seine Series metasediments consist of intercalated polymictic conglomerate, arenite, wacke, slate, and minor chemical metasediments. They occur as a fault-bounded, tectonically transported allochthon. Fumerton (1985) has recognized several other isolated fault-bound blocks of Seine Series metasediments which have been transported eastward from the Seine River wedge.

The metavolcanics consist of a complex assemblage of mafic to felsic flows and tuffs which are intercalated with banded chemical metasediments. Compositionally the metavolcanics range from chlorite to sericite schist. Intense carbonatization is common and depends on the proximity to shear zones, hinge zones of folds, and tonalite stocks. The metavolcanics are folded isoclinally about an east-northeast-trending fold axis which plunges at a moderate angle to the west.

Intruding the metavolcanics are a series of small tonalite stocks. The tonalite consists of fine-grained, whitish matrix containing small phenocrysts (less than 5 mm in diameter) of quartz and feldspar. Locally, the tonalite is brecciated and crosscut by a network of thin quartz-carbonate veins.

The Quetico Fault, a major dextral tear fault, and several associated splay faults extend over the entire length of the property and separate rock units of contrasting structural styles. The fault zone ranges from 10 to 20 m in width and is typified by rocks which display a well-developed fabric striking 070° with a near vertical dip. South of the fault, outcrops of isoclinally folded metavolcanics are observed; north of the fault, tectonically deformed Seine Series metasediments outcrops. As the fault zone is approached, biotite and carbonate alteration becomes pervasive.

Low grade gold mineralization is associated with an alteration aureole of extensively carbonatized and silicified metavolcanics surrounding the tonalite stock. At the Mayflower Prospect, located 1.5 km to the east, a similar geological setting is exposed, and high gold values occur erratically in quartz veins within the alteration aureole and are associated with massive to disseminated pyrite, and minor amounts of galena, sphalerite, arsenopyrite, and chalcopyrite (Fumerton 1985).

Future gold exploration should be directed to areas of extensive carbonatization and silicification which occur as alteration aureoles within the metavolcanics surrounding tonalite stocks and major shear zones.

RECENT EXPLORATION ACTIVITY IN THE LAC DES ILES AREA

Madelaine Mines Limited has been actively exploring the extent of a large palladium-platinum-copper-nickel-gold mineralized zone that is under option from "The Platinum Group". Work completed on the deposit includes at least 18 diamond-drill holes; three 130 m long, 8 to 10 m wide overburden trenches, and numerous roads. There are plans to bulk sample the high grade E-Zone portion of the Roby Zone and to continue diamond drilling.

Recent assessment work (Resident Geologist's Assessment Files, Ministry of Northern Development and Mines, Thunder Bay) indicates that J. Patrick Sheridan, who owns interests in numerous junior mining companies, has optioned two claim groups west of Tib Lake. A small 200 pound (90 kg) bulk sample was taken from a platinum-palladium-copper-nickel occurrence in the gabbro-noritic Tib Lake Intrusion and sent to Timmins Testing Laboratories (T.T.L.) Limited for metallurgical studies. The option covers properties owned individually by Walter Ranta and Knut Kuhner.

American Platinum Incorporated (formerly Silver Hoarde Resources Incorporated) is presently the largest landholder in the Lac des Iles area. The company owns, or has optioned, in excess of 260 claims covering the possible eastern extension of the Madelaine Mines mineralized zone and the entire south-southwesterly trending gabbroic "tail" of the Lac des Iles Complex. Exploration activity is presently underway on the 15 claim Wawiag Option due east of the Madelaine Mines mineralized zone. Work done to date includes linecutting, geophysics, stripping, geological mapping, and intensive sampling.

Cream Silver Mines Limited owns 59 claims in the northern ultramafic portion of the Lac des Iles Complex. These claims cover parts of the contact between the complex and the tonalitic country rocks. A two-phase exploration program is underway and includes mapping, trenching, prospecting, and geophysical surveys. Reports indicate that some anomalous platinum group element mineralization, of unknown extent, has been encountered.

International Platinum Corporation (formerly Silver Lake Resources Incorporated) has optioned six properties (two of which are adjoining) on at least four mafic-ultramafic intrusions in the vicinity of Lac des Iles. Exploration activity on these properties began in late summer and included linecutting, geophysical surveys, detailed mapping, stripping, trenching, and sampling. A diamond-drill program is planned.

Other companies that are active or have acquired ground in the Lac des Iles area include: Heenan Senlac Resources, Imperial Platinum Corporation, Walsten Exploration Services, Park Avenue Resources, Platinum Exploration Canada Incorporated, Equinox Resources Limited/Technigen Platinum Corporation (a portion of this ground is under dispute), and numerous unaffiliated prospectors.

EXPLORATION GUIDELINES

The following guidelines might be useful in locating deposits that are associated with, or similar to, some of the deposit types previously described.

Deposit Type 1: The Atikokan River Intrusions

These iron-copper-nickel-cobalt occurrences have four distinctive characteristics:

1. An intimate association with intense well-defined transform fault zones.
2. They are very erosion resistant and tend to form high, narrow, very steepsided linear ridges.
3. Significant and well-defined magnetitic signatures are exhibited due to their very high magnetite content.
4. Good linear, electromagnetic anomalies are produced due to a high, conductive sulphide content.

Deposit Type 2: The Quetico Intrusions

These copper-nickel-platinum-palladium-(gold, tungsten) occurrences are not as readily discernible as the Type 1 deposits. However, they have seven common or distinguishing features (MacTavish and Dutka, in press; MacTavish and Dutka *in* Patterson *et al.* 1986):

1. The intrusions occur as small isolated bodies within the relatively thin belt of turbiditic metasediments that comprises the northern part of the Quetico Subprovince.
2. They are slightly more erosion resistant than the surrounding metasediments and occur as topographic highs.
3. Because the intrusions occur within non-magnetic metasedimentary rocks they exhibit distinctive, relatively isolated and intense airborne magnetic anomalies.
4. Copper-nickel sulphide mineralization that is enriched in PGE's usually occurs near an internal contact between rock types, or near the contact with the surrounding metasediments.
5. The PGE-rich sulphide zones tend to occur in ultramafic rather than mafic intrusive rocks.
6. The silicates that host the PGE-rich sulphides are usually coarse grained and altered.
7. Sulphide mineralization in the PGE-rich zones commonly exhibit pyrrhotite blebs mantled with chalcopyrite.

Deposit Type 3: Chemical Metasediments

These rocks have been further divided into two subtypes that have some similarities with each other but do have some distinctive characteristics:

SUBTYPE 1

1. They are associated with felsic to mafic metavolcanics and clastic metasediments.
2. The rocks have formed in a reducing environment.
3. Pyrrhotite is the predominant sulphide mineral and usually occurs in semimassive to massive form.
4. Pyrite generally occurs in radial or concentric nodules within massive pyrrhotite.
5. Due to their conductive sulphide content they exhibit pronounced airborne electromagnetic anomalies due to their high conductive sulphide content.
6. They will exhibit pronounced magnetic anomalies coincident with the electromagnetic anomalies.

SUBTYPE 2

1. These rocks are associated with felsic pyroclastic metavolcanics.
2. They appear to have formed in a reducing environment and are closely associated with intertuff graphitic argillite and shale.
3. The content of pyrite is greater than that of pyrrhotite.
4. Pronounced airborne electromagnetic anomalies are commonly observed due to their high content of conductive sulphide mineralization.

5. They exhibit magnetic anomalies coincident with the electromagnetic anomalies.

Deposit Type 4: Shear Zones

1. These zones tend to form readily identifiable linear to curved topographic lows.
2. In many instances they will produce good linear to curved airborne VLF electromagnetic anomalies with little or no coincident magnetic anomalies.

PROPERTY VISITS 1986: ATIKOKAN COBALT-BASE METALS-PLATINUM GROUP ELEMENTS STUDY

The following is a list of properties visited during 1986, and illustrated on Figure 4.6.

1. Kawene Occurrence
2. Kawene Road Occurrence
3. Kroocmo Occurrence
4. Lynx Head Occurrence
5. Stewart-Sande Occurrence

INDUSTRIAL MINERALS

The Industrial Minerals Program was initiated in April, 1986 to encourage the development of industrial minerals in the Thunder Bay area. It is an extension of the Building Stone study which was conducted over the previous two years. The project is staffed by Myra Kennedy. Summer assistance was provided by Shawn Aris through the Northern Internship Program. The Industrial Minerals Program involves monitoring activities concerning industrial minerals in the area, examining and evaluating potential industrial mineral deposits, and identifying opportunities for industrial mineral development. In addition, assistance may be offered to prospectors in the form of property visits, sample analysis, and information and references concerning industrial minerals.

Industrial mineral production in the Thunder Bay Resident Geologist's area includes amethyst, decorative stone, and large amounts of sand and gravel. Potential deposits of dimension stone, decorative stone, potassic feldspar, spodumene (lithium, rare-element), pegmatites, silica, and lime are being evaluated. Within the area there exists geological potential for the development of a wide variety of other deposits including nepheline syenite, barite, calcium carbonate, niobium-tantalum, mica, graphite, apatite, asbestos, magnetite, hematite, clay, soapstone, fluorite, talc, and peat.

The development of industrial minerals in this area must be selective, based on sound evaluation of economic conditions and market potential. Industrial minerals have traditionally been produced in large volumes, close to industrial and manufacturing centres where the largest consumers of these products are found. This presents a challenge for the development of industrial minerals in Northwestern Ontario because the principal market is found in Southern Ontario and the United States. The cost of transporting a product to the marketplace can be prohibitive. A competitive position may be improved by considering industrial mineral deposits with any of the following characteristics:

1. **High market value**—A number of industrial minerals which have inherent higher market values may be able to withstand the high transportation costs incurred. In the Thunder Bay area, this would include dimension stone, nepheline syenite, and barite.
2. **Uniqueness/Exceptional Quality**—Industrial mineral commodities which are not found or produced elsewhere, which have special characteristics or which can replace imported products and those of very high quality, command a higher price and may be more economically viable. An example is unique dark coloured granite dimension stone.
3. **Availability of Local/Regional Markets**—A product used within the region avoids high transportation costs. An example is the use of marl for agricultural use.
4. **Availability of Low Cost Transportation**—A deposit located near major water transportation (Lake Superior and the Great Lakes transportation system) may have a competitive advantage over products which must be shipped by road and rail.

Rigorous evaluation of any potential industrial mineral deposit in the area is recommended before significant investment takes place. This involves not only determination of grade and size of the deposit but the completion of comprehensive market studies and transportation cost studies. The Northern Ontario Regional Economic Development Program (NOR-DEV) may be of interest to those evaluating industrial mineral deposits. Under the Resource Diversification and Development Program, assistance is available up to 75 percent (to a maximum of $75 000) of the approved cost of such pre-investment studies. The Ontario Mineral Exploration Program (OMEP) may assist with up to 25 percent of approved mineral exploration costs.

ACTIVITIES

The following is a summary of recent industrial mineral activities in the Thunder Bay Resident Geologist's area, excluding sand and gravel:

Dimension Stone

Exploration activity for black, brown, and red "granite" in the Marathon area continued in 1986. Granite was formerly produced in the area in the late 1800s and again from 1928 to 1932. The history of granite dimension stone development in the area is described by Kennedy and Gertzbein *in* Patterson *et al.* (1985 and 1986).

Noranda Incorporated (GECO Division) carried out geological mapping of two claim groups in areas of black syenite north of Marathon (outlined in Patterson *et al.* 1986, Figure 4.6). They report that potential quarry sites may exist on the southern group of claims but located no suitable areas for quarrying on the northern group of claims (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

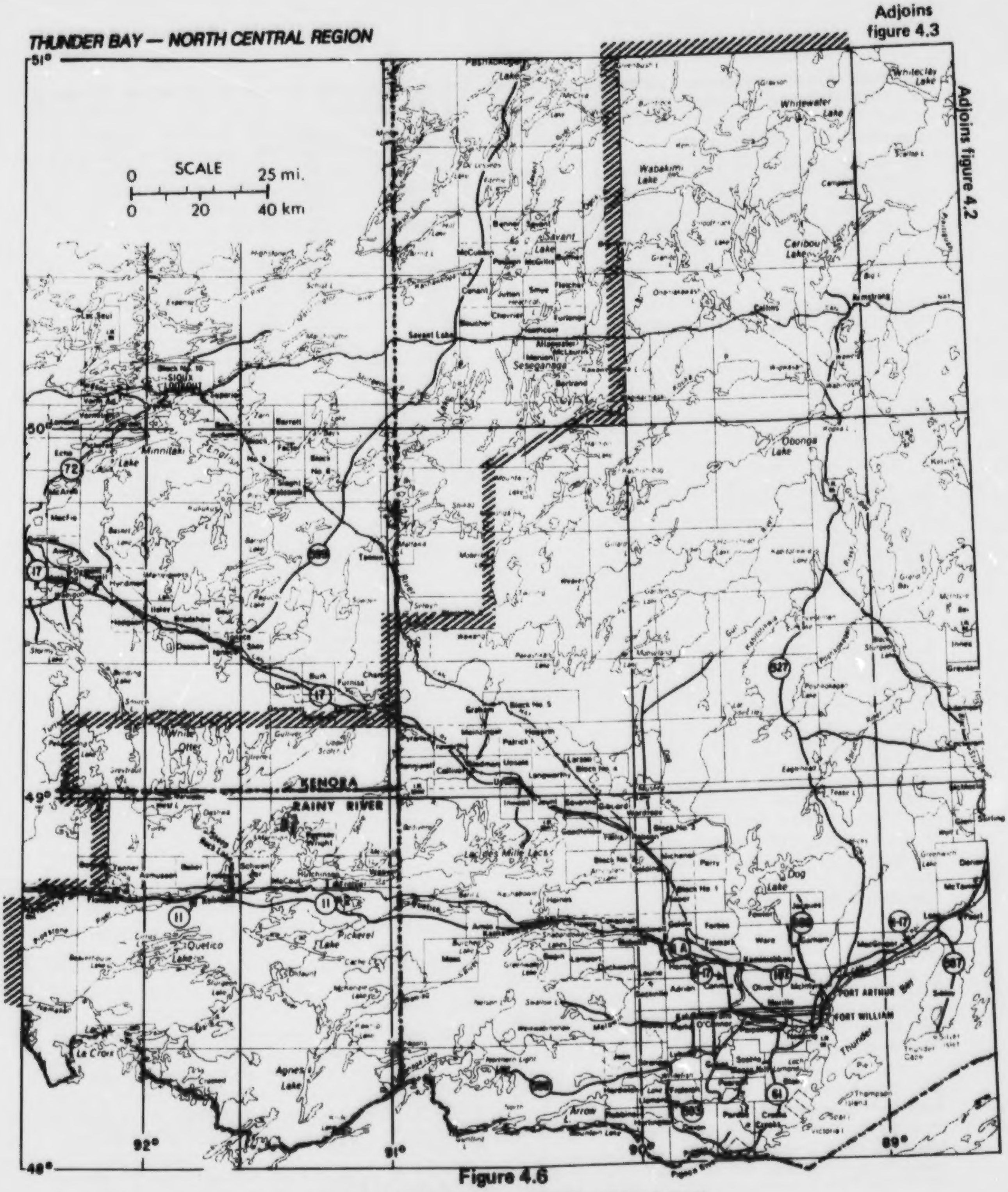
THUNDER BAY — NORTH CENTRAL REGION
Adjoins figure 4.3
Adjoins figure 4.2
SCALE
0
25 mi.
0
20
40 km
51°
50°
49°
48°
92°
91°
90°
89°
KENORA
RAINY RIVER
Savant Lake
Wabakimi Lake
Whitewater Lake
Caribou Lake
Sioux Lookout
Minnitaki Lake
Seseganaga
Ombabika
Armstrong
Obonga Lake
Dog Lake
Lac des Mille Lacs
Quetico Lake
Pickerel Lake
White Otter Lake
Agnes Lake
Arrow L.
Northern Light L.
La Croix
FORT ARTHUR
FORT WILLIAM
Thunder Bay
Thunder Cape
Silver Islet
Thompson Island
Victoria I.
72
17
11
11
17
527
61
587

Figure 4.6

PROPERTY VISITS 1986: ATIKOKAN COBALT- BASE METALS- PLATINUM GROUP ELEMENTS STUDY

1. Kawene Occurrence
2. Kawene Road Occurrence
3. Kroocmo Occurrence
4. Lynx Head Occurrence
5. Stewart - Sande Occurrence

TABLE 4.6: MAPS AND REPORTS PERTAINING TO THE NORTH CENTRAL REGION PUBLISHED DURING 1986 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports
OFR 5542
OFR 5572
OFR 5577
OFR 5606
OFR 5622
OFR 5630

Open File Maps
OFM 41
OFM 51
OFM 53
OFM 55
OFM 56
OFM 61
OFM 68

Preliminary Maps
P.2843
P.2955
P.2984
P.2985
P.2988
P.2990
P.2991
P.3046
P.3047
P.3055

Coloured Maps
2452 (reprint)

Geological Reports
GR 217 (reprint)
GR 239
GR 247

Miscellaneous Reports
MP 128
MP 129
MP 132

Study Series
Study 44

Aggregate Resources Inventory Paper
ARIP 124

Geochemical Series
Map 80757

D. Petrunka acquired further ground in the area, including claims near the former Angler quarrysite (black syenite). Several test blocks were removed from one site on his red (brown) syenite property located between Marathon and the former Angler station. He is currently clearing a number of sites in both black and brown syenite for further evaluation of quarry potential.

P. Culhane and W. McChristie staked 4 claims in black syenite near Marathon. The claims include the former Canadian Pacific Railway quarrysite and two small quarries opened by Peninsula Granite Quarries Company in the late 1920s. The property was optioned by D. Farrell and R.J. Kasner. Evaluation of the ground was carried out by consultant D. Richter (Hager-Richter Geoscience Incorporated, Windham, New Hampshire). Two potential quarry sites were identified, one of which was subsequently drilled.

Decorative Stone

Three local amethyst producers are marketing decorative stone in various grades for facing material and landscaping stone. Their markets include a large part of the north-central United States and Eastern Canada. A small amount of decorative marble is produced from the Lunmac Marble Property near Eaglehead Lake 65 km north of Thunder Bay (*see* Patterson *et al.* 1985, 1986).

Silica

W. Seeber is examining a silica deposit on two islands in Lake Superior near Rossport, where white sandstone (orthoquartzite) occurs as part of the Pass Lake Formation of the Sibley Group. A consultant's report outlines potential tonnage of 10 to 20 million tons of high grade silica on the Quarry and Channel islands. Preliminary grades of greater than 98 percent SiO_2, with a fairly low iron content are indicated.

Lime

Tri-Ven Minerals Corporation continued work on its Shillabeer Creek Marl Deposit in Cockeram Township. The deposit has been described by Speed *et al.* (1985). This year's work involved clearing brush and overburden, trenching, and test-hole boring. Tri-Ven hopes to supply local agriculture markets. A marketing study was completed in 1985 with funding assistance from NOR-DEV.

Pegmatites

Recent interest in the Georgia Lake area spodumene pegmatites has been prompted by anticipation of improved lithium-metal markets due to recent technological developments. There is also potential for ceramic grade spodumene and the rare earth element content of these pegmatites. The Georgia Lake area underwent extensive exploration for spodumene in the mid-1950s. The area is described by Pye (1965) and contains the most profuse development of rare earth element pegmatites in the province (Breaks 1980).

Armeno Resources Incoroporated has been active in the area since 1983. In 1984 they carried out a program of linecutting, geology, magnetometer, and VLF electromagnetic surveys on two claim groups; the Newkirk-Vegan Property and the Noranda-McVittie Property. Drilling in the 1950s outlined 750 000 tons of pegmatite having an average grade of 1.38% Li_2O from the Newkirk-Vegan Property and 261 000 tons of 1.03% Li_2O from the Noranda-McVittie Property (Pye 1965). During 1986, Armeno carried out a geochemical soil sampling program on the properties looking for indications of further lithium bearing structures.

During 1986, Armeno Resources Incorporated also acquired ground including the Jean Lake Deposit which is comprised of five pegmatite dikes. The property was previously worked in 1956 by Jean Lake Lithium Mines Limited. One of the veins (No. 4 or Parole Lake) was estimated to contain 1 689 000 tons of material having an average grade of 1.30% Li_2O to a depth of 1100 feet (Pye 1965). No new work is yet reported on this property.

The former M.N.W. Lithium Deposit was staked in 1986 by B. Zayachkivsky. Geological work was carried out on the property. The M.N.W. pegmatite is considered unique in the area because of its well developed internal zoning (Pye 1965). Milne (1962) examined the pegmatite in detail because of the presence of petalite and columbite. Breaks (1980) noted the presence of the rare earth element minerals columbite, cassiterite, and alkali beryl, and indicated that the M.N.W. pegmatite has high economic potential for rare metals. Previous work on the deposit includes diamond drilling in 1956 by Consolidated Mining and Smelting Corporation of Canada Limited, examination for beryl content later in the 1950s, and investigation of cesium content in 1960 (Pye 1965). During the mid-1970s Bird River Mining Company Limited (J.A. Donner) investigated the potential for ceramic grade spodumene (Resident Geologist's Files, Ontario Ministry Northern Development and Mines, Thunder Bay).

Feldspar

P. Skalesky, W. Peterson, and T. Peterson carried out further trenching on the western dike of the Buda Feldspar Deposit in Goldie Township. The property was optioned to Steep Rock Iron Mines Limited in 1980, who performed geological mapping, testing work, and analyses. The feldspar has potentially favourable K_2O content. The deposit includes two main pegmatite dikes composed of feldspar, quartz, and muscovite with minor tourmaline, garnet, and apatite. The largest dike (west) is approximately 450 m in length and varies from 40 to 60 to 120 m in width. The eastern dike is 300 m long and up to 21 m wide (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). The eastern dike is described in detail by Scott (1981).

Other Activities

Great Lakes Ceramics Incorporated produced unglazed tile at the former Thunderbrick plant in Thunder Bay from September, 1985, to January, 1986, and from June to September, 1986. They expect to start up again in January 1987. They are currently producing at a capacity of approximately 2 million square feet per year. The plant has the potential to produce 8 million square feet per year (R.J. Gotts, President, Great Lakes Ceramics Incorporated, Thunder Bay, personal communication, 1986). Great Lakes Ceramics uses clay from several deposits in Saskatchewan, Manitoba, and Alberta, which are owned by the parent company Avonlea Mineral Industries Limited.

Permanent Concrete has restored the old pier at Heron Bay. Five silos have been erected to provide a storage and distribution facility for cement, transported from Southern Ontario, for the Hemlo area mines.

GEOLOGICAL RESEARCH

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Details of research carried out by the Ontario Geological Survey are given in Thurston *et al.* (1986). A summary of these programs is listed below:

T.L. Muir—mapping of the Hemlo Deposit

M.W. Carter—geology of Blackwell and Laurie Townships

R. Sutcliffe—geology of the Lac des Iles Area

J. Macdonald—platinum-palladium mineralization of the Lac des Iles area

V.K. Gupta—geophysical studies in the Lac des Iles area

P.C. Thurston—continued on a revision of the Lakehead-Atikokan compilation area

R. Kristjansson—Quaternary geology of the Geraldton area

D. Kresz—geological mapping in Barbara, Meader and Pifher Townships.

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5. North Clay Belt and Lowland Resident Geologist's Area, Northern Region

W. O. Mackasey[1] and T. L. Hope[2]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Timmins

[2]Contract Geologist, Ontario Ministry of Northern Development and Mines, Timmins

INTRODUCTION

The Resident Geologist's office is staffed by W.O. Mackasey, Resident Geologist, and T.L. Hope, Contract Geologist. Kathy Perello served as an Experience '86 student assistant during the summer months. Sandra Beauchamp assisted with field and office assignments during the summer under the Northern Internship Program '86. Office quarters are shared with the Timmins Resident Geologist and support services are provided by Diane Draper, Data Geologist; Diane Egerland, Secretary; and Chris Hamblin, Drill Core Geologist.

Much of the field season was spent gaining familiarity with the geology, mineral deposits, and accessibility of the area. The release in June, 1986, of airborne geophysical survey data by the Mines and Minerals Division for the Hearst-Kapuskasing and Oba areas directed significant exploration work to these areas. A large part of the staff time was spent dealing with inquiries and activities relating to the territory covered by the airborne surveys.

Figures 5.1, 5.2, 5.3, and 5.4 summarize the 1986 activities in the North Clay Belt and Lowland area.

CLAIM STAKING ACTIVITY

A total of 12 243 claims were staked in the North Clay Belt and Lowland area from December 1, 1985, to November 30, 1986. As of November 30, 1986, 16 094 active claims were held in the area. Active claim staking areas for 1986 include the Detour Lake, Hearst-Kapuskasing, and Oba areas.

EXPLORATORY LICENCES OF OCCUPATION

The Onexco Oil and Gas Limited (formerly Onexco Minerals Limited) exploratory licence, covering 150 000 acres in the Moose River Basin, expired September 1, 1986. The ground was officially opened for prospecting and staking on September 15, 1986.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

As of November 30, 1986, four Ontario Mineral Exploration Program grants have been awarded to assist exploration programs in the North Clay Belt and Lowland area. A total of $400 700 has been committed as OMEP's share of exploration costs. Planned exploration expenditures for the four grants amount to $1 777 700.

DRILL CORE LIBRARY PROGRAM

Over 14 849.8 m of core representing 26 559.9 m of drilling in the North Clay Belt and Lowland area is currently available for public inspection in the Porcupine Mining Division Drill Core Library, Timmins. Table 5.1 and Figures 5.3 and 5.4 give details on the core collected in 1986.

Core and cuttings from some of the deep oil and gas test wells drilled in the Lowland are currently stored in the Ministry of Natural Resources, London, Ontario, core storage facility.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

In 1986, there were five projects undertaken by the Ontario Geological Survey in the North Clay Belt and Lowland Resident Geologist area.

Table 5.2 lists the maps and reports published by the Ontario Geological Survey for the area during 1986.

ENGINEERING AND TERRAIN GEOLOGY SECTION

A study of Ontario's limestone industry is currently being completed for the Ontario Government by Derry, Michener, Booth and Wahl Limited. The geological components of the study are being carried out by staff of the Engineering and Terrain Geology Section (Mazur *et al.* 1986). The limestone quarry in Moosonee is included in this study.

MINERAL DEPOSITS SECTION

Field and laboratory work was undertaken by Ford (1986) to document the geology of the residual phosphate deposits at Cargill Township (southwest of Kapuskasing) and Martison Lake (north of Hearst).

Springer (1986a) summarized the research currently underway on utilizing igneous phosphate rock (apatite) as a soil additive for farmlands deficient in phosphorus.

In a separate study, Springer (1986b) has begun documenting the technical characteristics of various Cretaceous clays from the Moose River Basin. The purpose of the work is to determine the feasibility of these clays for an Ontario-based pottery industry.

GEOPHYSICS/GEOCHEMISTRY SECTION

An airborne electromagnetic-magnetic survey was flown by Aerodat Limited for the Ontario Government in the Oba-Kapuskasing area in February and March, 1986 (Gupta and Barlow 1986). A total of 4836 line-kilometres of data were collected in the Pelletier-Ecclestone Townships area south of Hearst and Kapuskasing.

In the Derry-Minnipuka Townships area, near Oba, 3250 line-kilometres of data were collected. Maps with results of these surveys were released to the public on June 23, 1986.

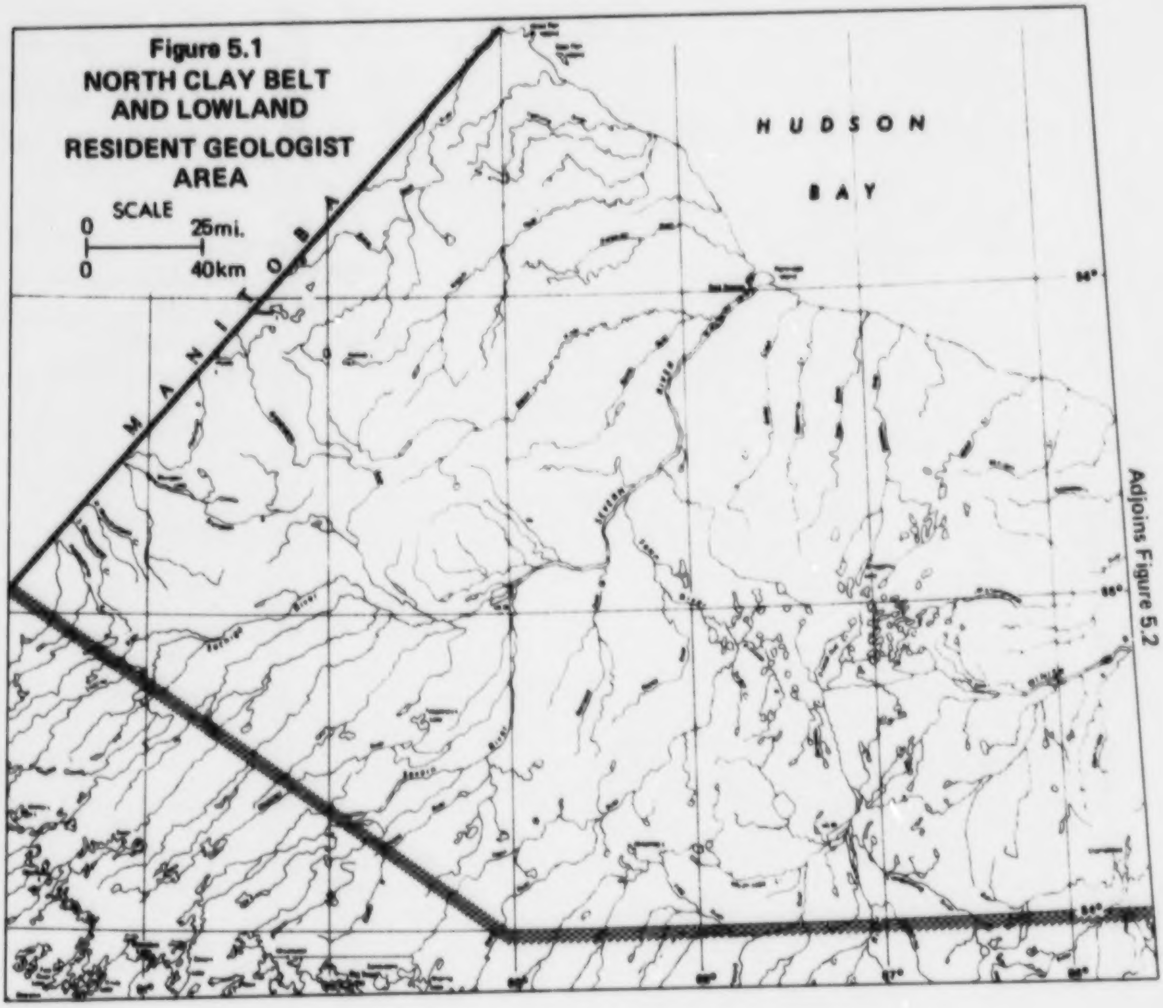


Figure 5.1
NORTH CLAY BELT AND LOWLAND RESIDENT GEOLOGIST AREA

SCALE
0 25mi.
0 40km
HUDSON BAY
MANITOBA
Adjoins Figure 5.2

● Detour Lake Mine. . . . . Au

○ Properties Under Major Evaluation

Property and Field Visits (see TABLE 5)

* Assessment Work Submitted, 1986

+ Claims Staked, 1986 (symbol represents approximately 40 claims)

11 Exploration Activity, 1986 (see TABLE 3)

• Drill Core Available For Viewing, 1986 see TABLE 1

▲ Ontario Geological Survey Projects, 1986

▨ Boundary of Resident Geologist's Area

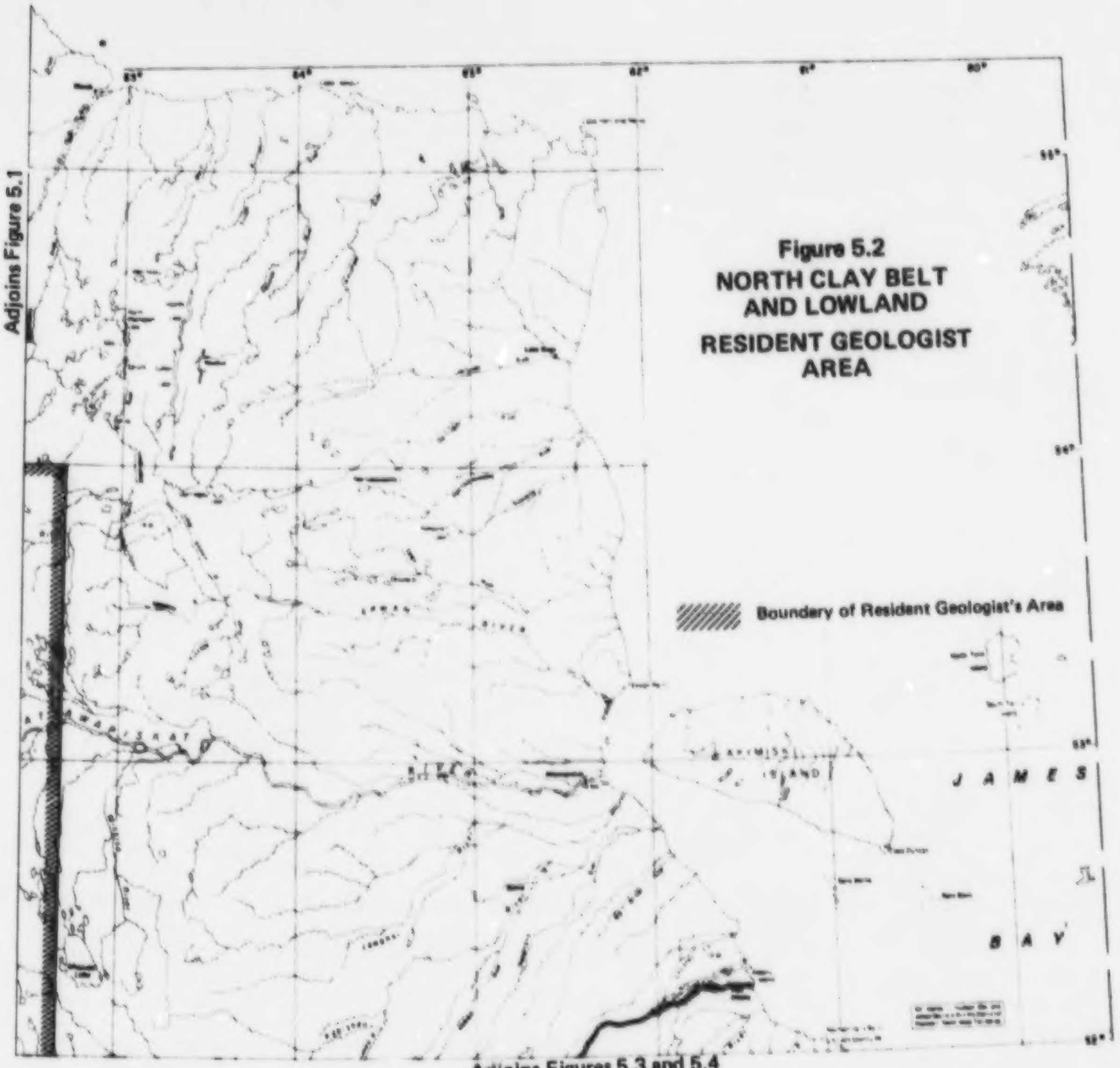
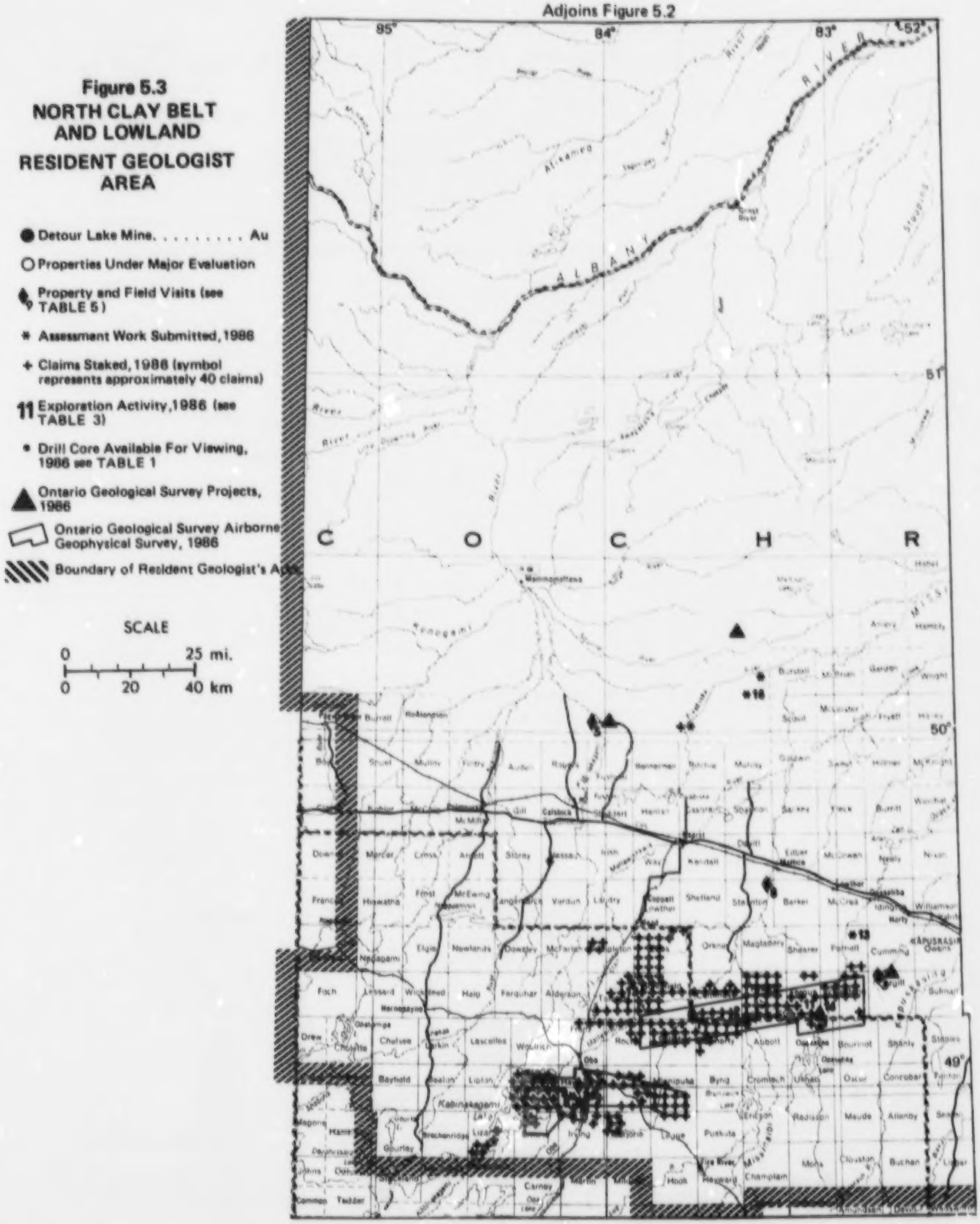

Adjoins Figure 5.1
85°
84°
83°
82°
81°
80°
55°
54°
53°
52°
Boundary of Resident Geologist's Area
ATTAWAPISKAT
AKIMISKI
ISLAND
JAMES
BAY
Adjoins Figures 5.3 and 5.4

Figure 5.2
NORTH CLAY BELT AND LOWLAND
RESIDENT GEOLOGIST AREA

- ● Detour Lake Mine. . . . . Au
- ○ Properties Under Major Evaluation
- Property and Field Visits (see TABLE 5)
- * Assessment Work Submitted, 1986
- + Claims Staked, 1986 (symbol represents approximately 40 claims)
- 11 Exploration Activity, 1986 (see TABLE 3)
- • Drill Core Available For Viewing, 1986 see TABLE 1
- ▲ Ontario Geological Survey Projects, 1986

Figure 5.3
NORTH CLAY BELT AND LOWLAND RESIDENT GEOLOGIST AREA


Adjoins Figure 5.2
● Detour Lake Mine. . . . . Au
○ Properties Under Major Evaluation
Property and Field Visits (see TABLE 5)
* Assessment Work Submitted, 1986
+ Claims Staked, 1986 (symbol represents approximately 40 claims)
11 Exploration Activity, 1986 (see TABLE 3)
• Drill Core Available For Viewing, 1986 see TABLE 1
▲ Ontario Geological Survey Projects, 1986
Ontario Geological Survey Airborne Geophysical Survey, 1986
▨ Boundary of Resident Geologist's A
SCALE
0
25 mi.
0
20
40 km
85°
84°
83°
52°
51°
50°
49°
ALBANY RIVER
Attawapiskat
Kenogami
Missinaibi
Kabinakagami
Mattagami
Kapuskasing
C O C H R
Mammamattawa
Fort Albany
Hearst
Kapuskasing
Oba
Nagagami
Foch
Drew
Chelsea
Lascelles
Bayfield
Lipton
Irving
Puskuta
Hook
Carney
Martin
Teddar
Hiawatha
McEwing
Elgie
Newlands
Frost
Mercer
Cross
Storey
Irish
Kendall
Shetland
Barker
Magladery
Shearer
Fauquier
Cumming
Owens
Bourinot
Shanly
Concober
Staples
Abbott
Byng
Cromlech
Usher
Radisson
Maude
Allanby
Mons
Clouston
Buchan
Champlain
Nisson
Neely
Williamson
Idington
Burstall
Garden
Wright
Way
Hanlan
Kohler
Gill
Stoddart
Burrall
Bannerman
Ritchie
Murray
Sankey
Fleck
Burritt
Hillmer
McKnight
Doherty
Farquhar
Alderson
Hap
Lessard
Wicksteed
Larkin
Woolrich
Brackenridge
Gourlay
Johns
Ottawa

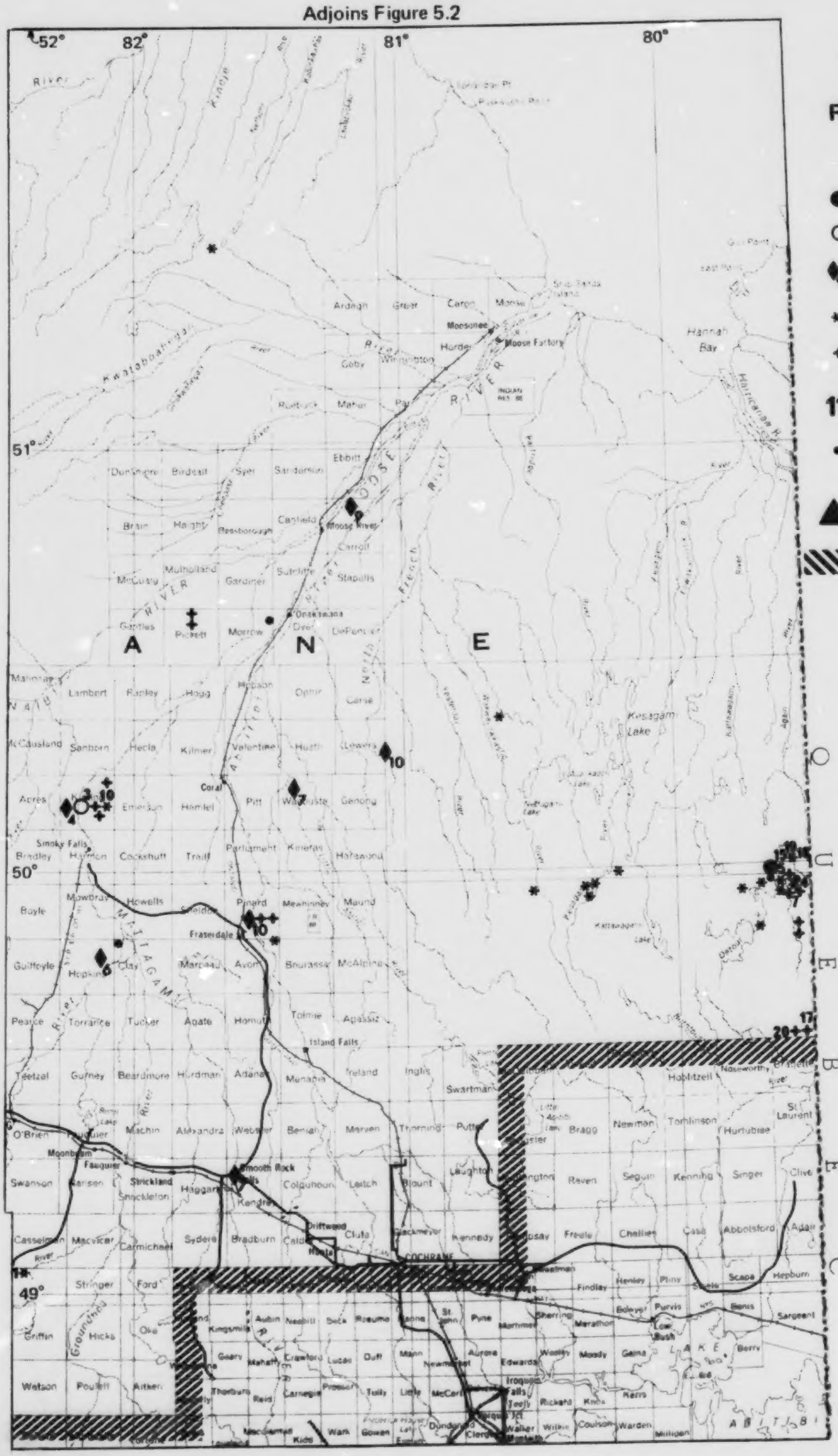

Adjoins Figure 5.2
52°
82°
81°
80°
51°
50°
49°
Moosonee
Moose Factory
Hannah Bay
MOOSE RIVER
Moose River
Onakawana
Fraserdale
Smoky Falls
Coral
Island Falls
Smooth Rock Falls
COCHRANE
Iroquois Falls
Kesagami Lake
Detour
A N N E
Q U E B E C
L A K E A B I T I B I
Ardagh
Greer
Caron
Moose
Coby
Horden
Mahar
Ebbitt
Sanderson
Canfield
Carroll
Stapells
Sutcliffe
Gardiner
Mulholland
McCuaig
Gentles
Pickett
Morrow
Lambert
Ranley
Hogg
Hepburn
Ophir
Sanborn
Hecla
Kilmer
Valentine
Lewers
Acres
Emerson
Hamlet
Pitt
Genong
Bradley
Harmon
Cockshutt
Traill
Parliament
Kineras
Hopkins
Clay
Marceau
Avon
Bourassa
McAlpine
Pearce
Torrance
Tucker
Agate
Homuth
Tolmie
Agassiz
Teetzel
Gurney
Beardmore
Hurdman
Adanac
Ireland
Inglis
Swartman
Hoblitzell
O'Brien
Fauquier
Machin
Alexandra
Webster
Bragg
Newman
Tomlinson
Hurtubise
Swanson
Hanlan
Strickland
Haggart
Colquhoun
Leitch
Blount
Laughton
Reaume
Seguin
Kenning
Singer
Clive
Casselman
Macvicar
Carmichael
Sydere
Bradburn
Calder
Clute
Kennedy
Frecker
Challies
Case
Abbotsford
Adair
Stringer
Ford
Findlay
Henley
Pliny
Steele
Scapa
Hepburn
Sargeant
Griffin
Hicks
Kingsmill
Aubin
Nesbitt
Sheraton
Watson
Poulett
Aitken
Thorburn
Reid
Carnegie
Little
McCart
Teefy
Rickard
Walker
Wark
Gowan
Dundonald
Clergue
Warden
Milligan
Kesagami Lake

Figure 5.4
NORTH CLAY BELT AND LOWLAND
RESIDENT GEOLOGIST AREA

● Detour Lake Mine. . . . . Au
○ Properties Under Major Evaluation
◆ 9 Property and Field Visits (see TABLE 5)
✱ Assessment Work Submitted, 1986
✦ Claims Staked, 1986 (symbol represents approximately 40 claims)
11 Exploration Activity, 1986 (see TABLE 3)
• Drill Core Available For Viewing, 1986 see TABLE 1
▲ Ontario Geological Survey Projects, 1986
▨ Boundary of Resident Geologists Area
SCALE
0 25 mi.
0 20 40 km

TABLE 5.1: CORE STORED DURING 1986 AT THE DRILL CORE LIBRARY, TIMMINS ONTARIO

Area/ Township	Company	Year Drilled	# Holes	Total Depth(M)	Core Stored(M)
Clay	Mattagami Mining Co. Ltd.	1955	6	1060.7	740.3
Morrow	Ontario Geological Survey	1985	1	321.0	321.0
Hawkins	Falconbridge Ltd.	1985	6	606.6	521.3
Lower Detour Lake	Westmin Resources Ltd.	1985	4	833.6	15.2

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

Bezys and Risk (1986) continued laboratory studies of the Upper Devonian Long Rapids Formation of the Williams Island area of the Moose River Basin. This formation is considered to be a possible source of shale oil. The depositional environment has been found to be that of a warm, tropical sedimentary basin with fluctuating oxygen content.

ACTIVITIES OF OTHER AGENCIES

GEOLOGICAL SURVEY OF CANADA

Mapping of the Quaternary glacial deposits of the Lowland has been in progress for the last two field seasons. Reports on this work, in conjunction with the University of Colorado, have been presented by Thorleifson and Wyatt (1986) and Wyatt *et al.* (1986).

GEOLOGICAL ASSOCIATION OF CANADA

A special session on the Kapuskasing Uplift was presented at the Annual Meeting of the Geological Association of Canada in Ottawa in May, 1986. Reports covering the geology and geophysics of parts of the Kapuskasing Structure in the North Clay Belt and Lowland area have been prepared by Boland and Ellis (1986), Cavaliere *et al.* (1986), Fountain and Salisbury (1986), Northey and West (1986), Percival (1986), and Percival and McGrath (1986a, 1986b).

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Kwon and Tilton (1986) reported on comparative isotopic studies of the Cargill and Borden carbonatite complexes. Zircon U-Pb ages show that, at 1870 Ma, these carbonatites are grouped as the oldest in the Canadian Shield.

LYNDON B. JOHNSON SPACE CENTER (NASA)

Field work was completed this past summer by W.C. Phinney, D.A. Morrison, and others, to map and sample selected Matachewan and Hearst diabase dikes in the North Clay Belt area.

TABLE 5.2: MAPS AND REPORTS PERTAINING TO THE NORTH CLAY BELT AND LOWLAND RESIDENT GEOLOGIST AREA PUBLISHED DURING 1986 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports	
OFR 5541	Peat and Peatland Evaluation of the Cochrane - Kapuskasing Area
OFR 5597	Palynological Analyses of Drillhole Series OGS 83-01 to 83-08D and OGS 84-01 to 84-11, Moose River Basin, Ontario
OFR 5599	Geology of the Hearst - Kapuskasing Area
OFR 5617	Geochemistry and Petrography of the Mattagami Formation Lignites, Northern Ontario
Miscellaneous Papers	
MP 128	Report of Activities 1985 Regional and Resident Geologists
MP 130	Geoscience Research Grant Program, Summary of Research 1985-1986
MP 132	Summary of Field Work and Other Activities 1986
Preliminary Maps	
P.2961	Precambrian Geology of Caithness and parts of Scholfield, Pelletier and Doherty Townships
P.2962	Precambrian Geology of Rykert, Fergus and parts of Abbott and Opasatika Townships
P.2963	Precambrian Geology of Ecclestone and Parts of Opasatika, Bourinot, Cargill and Shanly Townships
Geophysical Series	
Maps 80822-80830	Pelletier-Ecclestone Townships Area, Oba - Kapuskasing Region
Maps 80831-80837	Derry-Minnipuka Townships Area, Oba - Kapuskasing Region

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 5.3

Number on Figure	Individual or Company		Activity
1	J. Arsenault	Slack	Manual, Mechanical
2	Astralla Resources Ltd.	Caithness, Fergus, Rykert	Airborne electromagnetic and magnetic surveys
3	Carlson Mines Ltd.	Kipling	Feasibility and market studies
4	Dome Exploration (Canada) Ltd.	Lower Detour Lake	Diamond drilling
5	Dore Explorations Inc.	Lower Detour Lake	Electromagnetic survey
6	Falconbridge Ltd	Hawkins, Walls	Diamond drilling
7	Getty Resources Ltd.	Lower Detour Lake	Diamond drilling
8	Gold Fields Canadian Mining Ltd.	Hawkins	Airborne geophysical surveys, trenching, stripping and geological mapping
9	Golden Range Resources Inc.	Hawkins	Geology and geochemical survey
10	D. Hillier (Kaolin of Canada Inc)	Kipling	Geology and very low frequency electromagnetic survey
11	Kap Resources Ltd.	Fergus	Airborne electromagnetic and magnetic surveys
12	Kaphearst Resource Corp.	Caithness, Scholfield, Talbott, Ebbs, Roche, Franz	Airborne Input electromagnetic and magnetic survey
13	M. Lupien	Parnell	Diamond drilling
14	D. McKinnon, et al	Opasatika, Fergus, Ecclestone	Airborne magnetic and very low frequency electromagnetic surveys
15	Mother Cat Mines	Lower Detour Lake	Stripping
16	Noranda Exploration Co. Ltd.	Pivabiska River, W. of Burstall Twp	Magnetic and electromagnetic surveys
17	A. Perron	Kingroy Lake	Airborne magnetic and very low frequency electromagnetic surveys
18	Placer Development Ltd.	Lower Detour Lake	Very low frequency electromagnetic, magnetic and MaxMin electromagnetic surveys and geology
19	Westmin Resources Ltd.	Sunday Lake	Diamond drilling
20	559505 Ontario Ltd.	Kingroy Lake	Airborne magnetic and very low frequency electromagnetic surveys

MINING AND EXPLORATION ACTIVITY

Lists of the assessment work received and 1986 exploration activity pertaining to the North Clay Belt and Lowland area are found in Tables 5.3 and 5.4. Reports by Canex Aerial Exploration Limited and Sogepet Limited were transferred from the Thunder Bay Resident Geologist office.

METALS

Hearst-Kapuskasing Area

Results of Precambrian mapping and an airborne geophysical survey by the Ontario Geological Survey were released for the Caithness-Fergus Townships volcanic belt early in the year (Berger *et al.* 1986a,b,c; Berger 1986; Gupta and Barlow 1986). The geological mapping outlined felsic volcanic rocks and schists and gossan zones as areas warranting prospecting. The airborne survey detected 3528 electromagnetic (EM) anomalies. This work helped stimulate exploration in the area, and at present over 7500 claims have been staked.

Several companies and individual prospectors began exploration work for gold in the area, including airborne and geological surveys, prospecting, and geological mapping. Work is continuing over the winter months.

Oba Volcanic Belt

The airborne geophysical survey of the Oba area by the Ontario Geological Survey outlined 943 EM anomalies. Approximately 4000 claims have been staked in the Oba area in the last 12 months. Assessment reports for work by Falconbridge Limited in Hawkins and Walls Townships, submitted in 1986, provide details on an extensive drill program to test for gold mineralization in a felsic volcanic unit. Several drillholes intersected gold mineralization with

TABLE 5.4 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

AEM --Airborne electromagnetic survey
Au --Gold
BM --Base Metals
CS --Core Samples
DD --Diamond Drilling
EM --Electromagnetic survey
GC --Geochemical survey
GL --Geological survey
HLEM --Horizontal loop electromagnetic survey
IP --Induced polarization survey
Mag --Magnetic survey
Man --Manual labour
Mech --Mechanical work
Petro.--Petroleum
Pros --Prospectus
Rtr --Trenching
Str --Stripping
VLF --Very low frequency EM survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Avon	42 H/4 SW	L. LeFebvre	--	Assess.	Man	1985		T-2340
W. of Burstall Twp.	42 J/3 NW	Noranda Exploration	Au	Assess.	HLEM,Mag	1986	2.9336	T-2916
Fawn River	53 I/7	Canex Aerial Expln.	BM	Assess.	Mag	1972		T-797
Hawkins	42 C/16 NE	Falconbridge Ltd.	Au	Assess.	DD-13-1833.9m	1985		T-2802
				Assess.	DD-7-1723m	1986		T-2802
				Assess.	Assays	1983	2.9093	T-2802
				Assess.	Assays	1984-85	2.9095	T-2802
		Golden Range Res.	Au	Assess.	GL,GC	1985	2.9121	T-2804
				Assess.	GL,GC	1985	2.9122	T-2804
Hawkins, Walls	42 C/16 NE	Falconbridge Ltd.	Au	Assess.	Str	1984		T-2802
				Donated	Rtr,Assays,GC, DD-59-8473.9m	1984		T-2802
James Bay Lowlands	42 J,O	Sogepet Ltd.	Petro.	Assess.	GL,Pros	1969		T-1496
Kipling	42 J/1 NE	Kaolin of Canada	kaolin	Assess.	GL,VLF	1986	2.9361	T-3070
Lower Detour Lake	32 E/13 NE	Dome Exploration	Au	Assess.	DD-4-860.1m	1985		T-2447
		Mother Cat Mines	Au	Assess.	Str	1986		T-2790
		Westmin Resources	Au	Assess.	CS	1985		T-2331
				Assess.	Mag,EM,GL	1985	2.8831	T-2331
Lower Detour Lake, Atkinson Lake	32 E/13 NE, 32 E/13 SE	Getty Canadian Metals	Au	OMEP	Assays, DD-27-4371.2m	1983	63.4274 OM82-5C-164	T-2443
		Petromet Resources	Au	OMEP	GC,HLEM	1983	2.6514 OM83-5C-115	T-2772
Kesagami River	42 H/16 NW	Dome Exploration	Au	Assess.	DD-5-721.8m	1985		T-2813
Kesagami River, Ministik Creek	42 H/16 NW	Dome Exploration	Au	Assess.	DD-7-1030.2m	1985		T-2813
Marquis Lake	42 H/16 NE	Dome Exploration	Au	Assess.	DD-5-897m	1985		T-2812
Nassau	42 P/9 NE	J. Millette	Au	Assess.	Mech	1985		T-3009
Nettogami River	42 I/2 NE	Noranda Exploration	Au	Assess.	Mag,EM	1985	2.8775	T-3023
Parnell	42 J/7 NW	M. Lupien	Au	Assess.	DD-1-31.4m	1986		T-2332
Pivabiska River	42 J/4 SE	Noranda Exploration	Au	Assess.	DD-3-367.2m	1985		T-2916
				Assess.	Mag,HLEM	1986	2.9334	T-2916
				Assess.	Mag,HLEM	1986	2.9335	T-2916
Renesig Creek	42 J/3 SW	Noranda Exploration	Au	Assess.	DD-2-636.2m	1985		T-2916
Severn River	53 P/1	Canex Aerial Expln.	BM	Assess.	AEM	1971		T-3065
				Assess.	Mag,IP	1971		T-3065
				Assess.	Mag,IP	1972	83.1-82	T-3065
Slack	42 G/1 SW	J. Arsenault	Au	Assess.	Man,Mech	1986		T-2363
Sunday Lake, Lower Detour Lake, Hopper Lake	32 E/13 NE, 32 E/13 NW, 32 L/4 SE	Westmin Resources	Au	OMEP	Mag,VLF,HLEM, Sampling,GL,GC, DD-9-1227.9m	1983	63.4276 OM82-5C-168	T-2331
Tomorrow Lake	42 H/15 NE	Dome Exploration	Au	Assess.	DD-2-292.6m	1985		T-2875

values that range from 5.05 to 23.0 g/t over widths of 1 m (Resident Geologist files, Timmins). The company re-optioned the property from prospector Larry Gervais and is currently drilling deep test holes (Falconbridge Limited, personal communication, 1986).

Golden Range Resources Incorporated submitted reports for geological and geochemical work completed in 1985 on its Hawkins Township property.

Gold Fields Canadian Mining Limited completed a gold exploration program in Hawkins Township consisting of an airborne geophysical survey, trenching, stripping, and geological mapping. Further work is planned for 1987 (Gold Fields Canadian Mining Limited, personal communication, 1986).

Detour Lake Area

The Detour Lake Mine completed its third year of production in 1986. This mine operates as a joint venture between Amoco Canada Petroleum Company Limited and Campbell Red Lake Mines Limited. Current production for the year, which has been mainly from the open pit operation, totals 715 000 tonnes as of November 30, 1986. During this period 80 965 ounces (2 518 293 g) of gold have been shipped. It is anticipated that more than 86 000 ounces (2 674 858 g) of gold will have been shipped by the end of 1986.

A 610 m shaft was completed in November, 1985. Two exploration levels have been established, the 7th at 360 m and the 11th at 560 m below surface respectively. Lateral advances total 1523 m for 1986. A total of 2900 m^3 of ore and waste rock were excavated from underground during the year. Of this, approximately 50 688 tonnes, primarily from the 7th level, were bulk sampled. Approximately 33 766 tonnes were mined from the "main zone". The remaining 16 922 tonnes consisted of "quartz-talc-carbonate" material.

Planning reserves above the 11th level are estimated to be 6.3 million tonnes at 5.2 g of gold per tonne. This includes only a portion of the "quartz-fracture" material in the hanging wall. Drilling results indicate that there is potential for additional reserves below the 11th level.

Company officials expect to reach a decision early in 1987 on bringing the underground mine into production. In the meantime, preproduction development is in progress above the 9th level. Full production could be achieved by the fourth quarter of 1987 at a rate of 1800 tonnes per day. A mechanized cut and fill mining method would be utilized.

There are presently 155 persons employed at the mine site. It is estimated that this would rise to 320 persons by the end of 1987 and eventually to an ultimate level of 340 persons. [The above information in the preceding five paragraphs is a personal communication from Detour Lake Mine, 1986.]

Marmont (1986) has recently described the geology of the Detour Lake Mine.

Dome Exploration (Canada) Limited submitted assessment work reports for drilling completed in 1985 in the Lower Detour, Kesagami, Tomorrow, and Marquis Lakes areas. During 1986, five diamond-drill holes were completed south of Detour River in the Lower Detour Lake area. The holes were for sectional drilling to gain geological information on the area. No gold values of economic significance were encountered by the drilling. No further work is planned at this time (Dome Exploration (Canada) Limited, personal communication, 1986).

Getty Resources Limited completed a six-hole diamond-drill program totaling 750 m during December, 1986, on their Detour Lake Property. The drilling was to test for gold mineralization within a felsic volcanic rock sequence. Drill targets were selected from magnetic and electromagnetic anomalies. A cherty iron formation unit with up to 40% sulphide mineralization was intersected by the drilling (Getty Resources Limited, personal communication, 1986).

Westmin Resources Limited, as of December, 1986, has completed 75% of a 13 hole, 2000 m diamond-drill program on their Sunday Lake Gold Property. Drilling is expected to be finished early in 1987. The program, which is assisted by the Ontario Mineral Exploration Program (OMEP), is to explore an interpreted extension of the Detour Lake Mine structure. Guided by electromagnetic conductors, the focus of exploration is along a volcanic-sedimentary contact marked by veining and exhalative-type alteration (Westmin Resources Limited, personal communication, 1986). The company submitted assessment work reports for geophysical, geological, and geochemical surveys completed in 1983.

Several other companies have been active in the Detour Lake area as listed in Tables 5.3 and 5.4.

Fushumi-Burstall Townships Volcanic Belt

Noranda Exploration Company Limited continued its search for gold north of Hearst. Horizontal loop electromagnetic and magnetic surveys were completed in 1986. Logs for several diamond-drill holes completed during 1985 have been submitted for assessment work.

Nettogami River Area

Magnetic and electromagnetic surveys were completed in 1985 by Noranda Exploration Company Limited over a drift-covered volcanic belt 80 km northwest of the Detour Lake Mine. No further work is planned for this area (Noranda Exploration Company Limited, personal communication, 1986).

Kingroy Lake Area

A small segment of the Casa Berardi Belt extends west into this area. During 1986, airborne magnetic and VLF electromagnetic surveys were flown over properties held by Alex H. Perron and 5559505 Ontario Limited.

INDUSTRIAL MINERALS

Sherritt Gordon-Campbell Resources Joint Venture

With the softening world-wide demand for fertilizers, plans for further work by the joint venture on the Cargill and Martison Lake Phosphate Deposits have been suspended. Sherritt Gordon Mines Limited closed their Kapuskasing field office in 1986.

TABLE 5.5: 1986 FIELD AND PROPERTY VISITS BY THE RESIDENT GEOLOGIST IN 1986.

1. Caithness-Fergus Townships Volcanic Belt
2. Oba Volcanic Belt
3. Cargill Phosphate Deposit
4. Kipling Township Kaolin Deposit
5. Limestone Rapids Area
6. Clay-Howells Alkalic Complex
7. Diabase Dike Study
8. Missinaibi River
9. Moose River Gypsum Deposits
10. Mafic Intrusions

Ford (1986) began an investigation of the geology and mineralogy of the two phosphate deposits to gain information on possible mineralogical and chemical zonation, and to help determine conditions of residual phosphate formation.

The Mineral Resources Branch of the Mines and Minerals Division commissioned two studies on phosphate in 1986. The first is an analysis of the prospects of Ontario phosphate developments for the fertilizer industry. The second study is to test the suitability of Cargill phosphate rock being substituted for bone ash in the manufacturing of fine bone chinaware.

Agriculture Canada, with the collaboration of the Mines and Minerals Division, Ministry of Northern Development and Mines, is continuing test work on composting Cargill phosphate rock for the production of low cost fertilizer (Springer 1986a). Results to date indicate that high phosphorus solubility levels can be achieved. The University of Guelph is conducting tests using vermiculite from the Cargill Deposit as a cation exchange agent to produce enhanced solubility of phosphorus from phosphate rock. This research is leading the way to the development of low cost fertilizers from environmentally troublesome manure and wood waste products.

Kaolin from the Cargill Deposit is being studied by Springer (1986a) and Ford (1986), and appears to have excellent handling and firing characteristics for use in pottery.

Carlson Mines Limited

In 1985, Carlson Mines Limited completed a preliminary capital and operating cost study for the Kipling Township kaolin-silica sand deposit and shipped a 500 ton bulk sample for metallurgical test work. Feasibility and market studies have continued during 1986.

Kaolin of Canada Incorporated

Geological and geophysical surveys were completed on Kaolin of Canada Incorporated's Kipling Township property in 1986.

FIELD AND PROPERTY VISITS

Field and property visits for 1986 are listed in Table 5.5.

LIMESTONE RAPIDS AREA

A 12 m section of Cretaceous sedimentary rock on the Kabinakagami River was examined and sampled during the field season. This exposure, which occurs about 46 km northwest of Hearst, appears to be a karst infill deposit in flat-lying limestone deposits of the Silurian Kenogami River Formation. The Cretaceous sedimentary rocks are dominantly unconsolidated green, red, and brown silts and clays with minor kaolinitic quartz sands. Work by Springer (1986b) indicates that this occurrence contains high-firing clays that are potentially suitable for the pottery industry. A number of samples were collected for detailed ceramic testing.

CLAY-HOWELLS ALKALIC COMPLEX

An area of previously unmapped syenite in the southern part of Hopkins Township was examined. A system of lumbering roads now provides access to this area. Some blocks of syenite were collected to test suitability for use as facing stone, but, when cut, were found to contain a weathering zone several centimetres thick. Further sampling is planned for the next field season.

DIABASE DIKE STUDY

Assistance was given to geologists from the Lyndon B. Johnson Space Center in locating and sampling Matachewan and Hearst swarm diabase dikes. This data is to be used for an ongoing petrological research program at the Space Center.

MISSINAIBI RIVER AREA

A 10 km section of Quetico metasediments, exposed along the Missinaibi River in Staunton Township, was examined. Previous reports suggested that massive and pillowed mafic volcanic rocks and conglomerate were present in this section. Close examination showed that only dark-coloured amphibolitic wacke sedimentary rocks and diabase dikes exist. A thin bed of interformational conglomerate was located 2 km south of Crow Rapids.

MOOSE RIVER GYPSUM DEPOSITS

A few hundred pounds of brownish grey gypsum was collected from the eastern bank of the Moose River near the boundary of Ebbitt and Carroll Townships. This material is similar in appearance to that from upstream in Canfield Township which has been successfully used for alabaster rock sculpture work. Samples from the eastern bank will be used for further test work.

MAFIC INTRUSIONS

During the field season two mafic intrusive bodies along the Kapuskasing Structure were examined.

The Abitibi Canyon mafic complex in Pinard Township consists of green-grey to dark grey, fine- to medium-grained massive gabbro. Minor pyrite and rosenite staining was noted.

The North French River pyroxenite in Lewers Township is medium to coarse grained and dark green. Some pyroxene crystals are several centimetres across. A 20 cm thick foliated and drag folded carbonatite layer containing disseminated pyrite and magnetite was found within the pyroxenite.

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6. Timmins Resident Geologist's Area, Northern Region

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[2]Data Geologist, Ontario Ministry of Northern Development and Mines, Timmins

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RESIDENT GEOLOGIST STAFF ACTIVITIES

Staff of the Timmins Resident Geologist's Office includes: L.E. Luhta, Resident Geologist; P.J. Sangster, Resource Geologist; and D.C. Egerland, Secretary. During 1986, D.M. Draper was hired on a contract basis as Data Geologist, J.C. Ireland held the contract position of Economic Geologist for the Swayze Belt, and S.E.A. Calhoun was hired on contract for the position of Resource Geologist, while P.J. Sangster is on a six-month training and development assignment with the Timmins Mining Recorder's Office. Additional temporary staff hired in 1986 were B. Polk under the Internship '86 Program and K. Perello under the Experience '86 Program.

C.D. Hamblin was hired on a permanent basis as Drill Core Librarian. Drill Core Library temporary staff hired under Experience '86, Internship '86, and Section 38 Special Employment programs included: M. Bradshaw, C. Burns, R. Chodan, A. Davidson, M. Giorgetti, M. King, R. Maass, C. McIlquham, B. Michaud, A. Reid, B. Seeton, R. Turcotte, D. Wahlman, and B. Walker.

The level of exploration and development activity in this area was very high due to the increase in the price of gold during 1986. The Timmins Resident Geologist's staff spent considerable time in consultative duties, with over 2300 office consultations recorded, an increase of 500 over 1985's visitor total. Emphasis was placed on examining and reporting on properties currently being explored and/or developed.

In conjunction with the Swayze Belt Economic Geologist Program, Geological Data Inventory Folios for 11 central Swayze area townships were compiled during 1985 and 1986 and final preparations are being made for their submission for publication in early 1987.

Other staff activities in the past year included: providing geological information to, and conducting geological field trips for, visiting academic and industry groups, from Canada and various other countries such as Australia, China, Egypt, Finland, Japan, and the Soviet Union; and organizing seminars and presenting lectures on local geology.

In the Timmins Resident Geologist's area there are presently nine producing gold mines, one producing base metal mine, and one producing industrial mineral mine. There are 15 advanced gold evaluation and development projects under way and one advanced industrial mineral development project. In 1986, there were at least 13 major and 34 junior mining exploration companies active in the Timmins area, and 9 individuals conducting exploration projects.

CLAIM STAKING ACTIVITY

From December, 1985, to the end of November, 1986, 17 309 claims were recorded in the Porcupine Mining Division. Of this total, 5066 claims were recorded in the Timmins Resident Geologist area. There are at present 31 808 active claims in the Porcupine Mining Division as compared to 21 793 claims active at this time last year. These active claims represent approximately 1 272 320 acres (514 908 hectares) of ground being explored in the entire mining division. In the Timmins Resident Geologist area, there are 16 442 active claims representing 657 680 acres (266 163 hectares) of ground under exploration. Additional programs on patented ground are not included in these figures.

During 1986, intensive claim staking activity was focused in the six northern Swayze Belt townships of Muskego, Reeves, Sewell, Keith, Penhorwood, and Kenogaming; Denyes and Swayze Townships in the central Swayze area; and Groves Township in the southeastern extension of the Belt. Moggy Township, located at the northern end of the Batchewana Belt, was also an active area, with over 140 claims recorded for 1986. The level of staking remained high in the townships extending south and east of Timmins, and increased staking was noted in Reaume, Mann, Newmarket, McCart, and Little Townships to the northeast of the city.

The most active stakers in the Timmins Resident Geologist area included: Ingamar Explorations Limited; Mid-Canada Gold and Copper Mines Limited; D. McKinnon; Noranda Exploration Company Limited; O. Hicks, and H. Gonzalez.

CORE LIBRARY PROGRAM

From January to the end of November, 1986, a total of 464 representatives of industry and government made use of the Core Library facilities and 18 895 m of drill core were collected. The Core Library now has approximately 112 650 m of core cataloged and computerized, representing some 319 500 m of drilling (after telescoping).

During 1986 drill core was received from the following sources:

Argentex Resource Exploration Corporation
Chevron Canada Resources Limited
Cominco Limited
Esso Minerals Canada
Falconbridge Limited
Goldeldt Explorations Limited
Ground Hog Gold Mines Limited
Mattagami Mining Company Limited
Newmont Mines Limited

Ontario Geological Survey (Black River-Matheson (BRIM) Project)
Orequest Consultants Limited
Quinterra Resources Incorporated
Radio Hill Mines Company Limited
Robert S. Middleton Exploration Services Incorporated
Utah Mines Limited
Westmin Resources Limited
Zahavy Mines Limited

OPERATING MINES

BASE METALS

Falconbridge Limited, Kidd Creek Mine

Although the complete 1986 figures are unavailable at the time of writing, production for the Kidd Creek Mine in Kidd Township should be 4 535 000 tonnes (4 998 980 tons) at an average grade of 2.86% copper, 6.10% zinc, and 81.73 g/t (2.38 ounces per ton) silver. This provides a total of 112 140 tonnes (123 613 tons) of copper, 134 000 tonnes (147 710 tons) of zinc, 191 300 kg (421 737 pounds) of silver, 613 tonnes (676 tons) of cadmium, and 503 510 tonnes (555 025 tons) of sulphuric acid. These products were produced both at the company's metallurgical complex in Timmins and on a toll basis elsewhere in Canada. Also, 60 568 tonnes (66 765 tons) of zinc concentrate grading 54% zinc, and 29 952 tonnes (33 016 tons) of zinc and silver concentrate grading 54% zinc and 95 g/t (2.77 ounces per ton) silver and 14 070 tonnes (15 510 tons) of concentrate grading 15% lead, 4.5% copper, and 677 g/t (19.75 ounces per ton) silver were sold from the previously mentioned ore.

Seventy-five percent of the production at Kidd Creek was from the Number One Mine, with almost all the ore coming from above the 2000-foot (610 m) level. Most of the remaining 25% of production came from the Number Two Mine between the 2800-foot (853 m) and 3200-foot (975 m) levels. A minor amount of mining was done between the 3800-foot (1158 m) level and the 4000-foot (1219 m) level.

In 1986, underground development at Number One Mine totaled 6871 m (5260 m of lateral and 1611 m of vertical development). At the Number Two Mine, development totaled 6524 m (including 5170 m of lateral and 1354 m of vertical development). This compares to the 1985 figures of 9714 m at the Number One Mine and 5993 m at the Number Two Mine. Underground diamond drilling totaled 15 530 m, of which 29% was ore delineation drilling, 33% was considered primary ore definition drilling, and 38% exploratory drilling. The total underground drilling for 1985 was 21 610 m. Most of the exploratory drilling was done from the 4600-foot (1402 m) level. Three exploratory holes were drilled down to the 6000-foot (1829 m) level and one hole has been started at the time of writing to intersect the downward projection of the orebody at the 7000-foot (2134 m) elevation. No surface exploratory drilling was done at the minesite in 1986, compared to 1376 m of drilling done in 1985.

A $86 million expansion started in 1985 is to be completed at the company's metallurgical facilities in 1988. This expansion will enable the company to smelt and refine more of its concentrate production.

The number of persons employed in mining and metallurgy at Falconbridge Limited's operations in Timmins in 1986 was 2495. The 1985 figure was 2713 and the 1984 figure was 2808 (Falconbridge Limited, personal communication, 1986).

PRECIOUS METALS

Dome Mines Limited

Although the 1986 figures are not available at the time of writing, it is expected that the Dome Mine in South Porcupine will mine and mill 1 065 000 tons (964 000 tonnes) of gold ore grading 0.13 ounce gold per ton (3.87 g/t). This compares to the 1985 production when 125 797 ounces (3 912 714 g) of gold were recovered from 1 028 000 tons (932 600 tonnes) at the same grade. Ore sources by mining method are 64% longhole, 29% cut and fill, and 7% from development. Long term plans are to increase mining by the cut and fill method.

Ore reserves at the end of 1985 were calculated to be 2 538 000 tons (2 302 000 tonnes) grading 0.170 ounce gold per ton (5.83 g/t). Over 45% of the mill feed is still extracted above the 2000-foot (610 m) level.

In 1986, 18 119 feet (5523 m) of lateral development (drifts, crosscuts and subdrifts) and 1930 feet (588 m) of raising was done. This is lower than the 1985 totals of 20 710 feet (6312 m) and 1928 feet (588 m) respectively. In 1985, underground diamond drilling totaled 62 500 feet (19 050 m) of which exploratory drilling totaling 19 250 feet (5867 m) was done in the new Eight Shaft area. This is higher than the previous years total of 53 800 feet (16 398 m) of underground diamond drilling.

At present, two long drives are advancing from the Number Eight Shaft along the 32nd and 33rd levels (4500 feet (1372 m) and 4800 feet (1463 m) below surface) toward the old Number Seven (internal) Shaft area. This shaft was abandoned in 1971 when exploration was not successful in finding substantial reserves at grades of 0.25 ounce gold per ton (8.6 g/t). Now grades over 0.15 ounce gold per ton (6.0 g/t) are considered to be ore grade. By next year stope development of 0.5 million tons will begin in the Eight Shaft area between the 32nd level and the 29th level, the first in this new part of the mine.

Dome is planning (subject to the company's directors' approval) a $14 million mill improvement project in 1987 to change the gold extraction process from cyanidation to carbon and pulp.

A total of 773 people were employed by Dome Mines Limited at their operations in South Porcupine during 1986 (Dome Mines Limited, personal communication, 1986).

Owl Creek Mine

At the Falconbridge Limited's Owl Creek open pit gold mine, production in 1986 totaled 122 172 tonnes (134 672 tons) grading 5.5 g/t gold (0.161 ounce gold

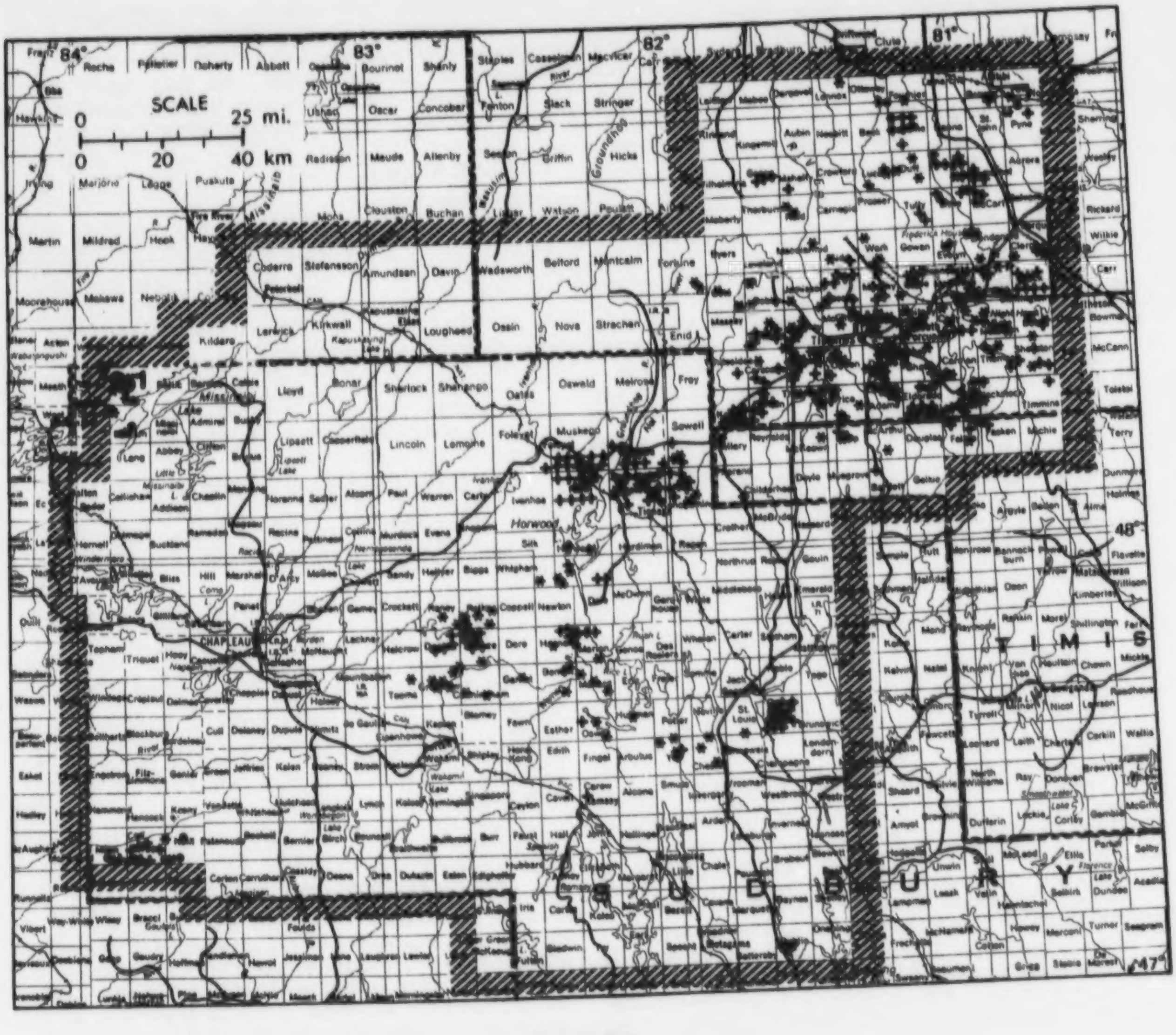

SCALE
0
25 mi.
0
20
40 km
84°
83°
82°
81°
48°
47°
CHAPLEAU
S U D B U R Y
T I M I S

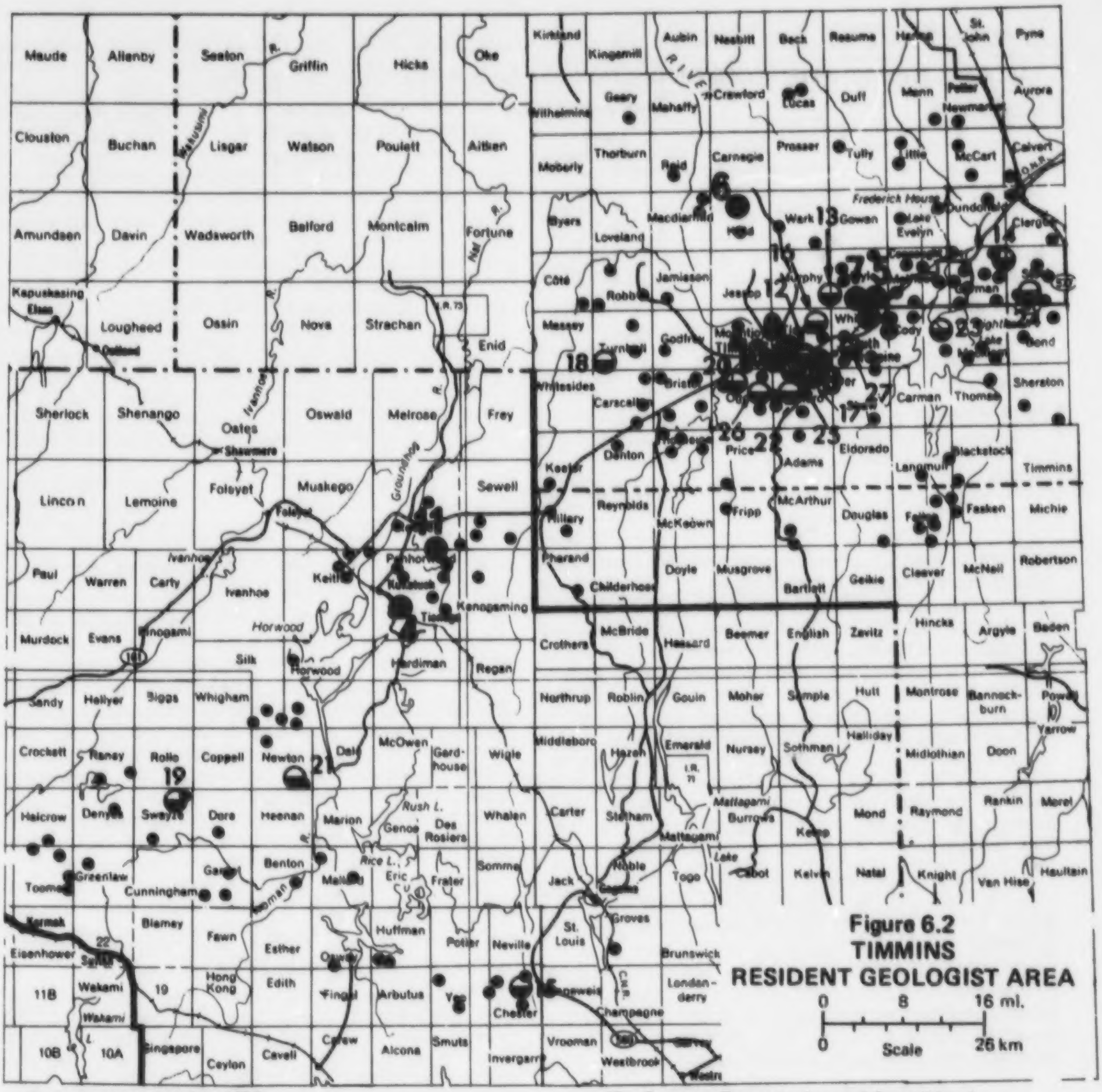
Figure 6.1
TIMMINS
RESIDENT GEOLOGIST AREA

● Producing Mines, 1986
1. Anglo Dominion Gold Exploration Ltd. and Canreos Minerals (1980) Ltd . . . . Au
2. Barrick Resources Corp. and Royex Gold Mining Corp., Renabie Gold Mines Ltd. . . . . Au

✱ Assessment Work Submitted, 1986

✚ Claim Staked, 1986 (✚ per 20 claims)

• Exploration Activity, 1986


Maude
Allenby
Seaton
Griffin
Hicks
Oke
Kirkland
Kingsmill
Aubin
Nesbitt
Beck
Reaume
St. John
Pyne
Clouston
Buchan
Lisgar
Watson
Poulett
Aitken
Wilhelmina
Geary
Mahaffy
Crawford
Lucas
Duff
Mann
Potter
Newmarket
Aurora
Moberly
Thorburn
Reid
Carnegie
Prosser
Tully
Little
McCart
Calvert
Amundsen
Davin
Wadsworth
Belford
Montcalm
Fortune
Byers
Loveland
Macdiarmid
Hoyle
Wark
Gowan
Lake Evelyn
Frederick House
Dundonald
Clergue
Kapuskasing
Loughead
Ossin
Nova
Strachan
Enid
Côté
Robb
Jamieson
Jessop
Murphy
Whitney
Massey
Turnbull
Godfrey
Mountjoy
Tisdale
Cody
Bond
Sherlock
Shenango
Oates
Oswald
Melrose
Frey
Whitesides
Carscallen
Bristol
Ogden
Carman
Thomas
Sheraton
Lincoln
Lemoine
Foleyet
Muskego
Sewell
Keefer
Denton
Price
Adams
Eldorado
Langmuir
Blackstock
Timmins
Hillary
Reynolds
McKeown
Fripp
McArthur
Douglas
Fallon
Fasken
Michie
Paul
Warren
Carty
Ivanhoe
Keith
Penhorwood
Kenogaming
Pharand
Childerhose
Doyle
Musgrove
Bartlett
Geikie
Cleaver
McNeil
Robertson
Murdock
Evans
Kinogama
Horwood
Silk
Hardiman
Regan
Crothers
McBride
Hassard
Beemer
English
Zavitz
Hincks
Argyle
Baden
Sandy
Hellyer
Biggs
Whigham
Northrup
Roblin
Gouin
Moher
Semple
Hutt
Montrose
Bannockburn
Powell
Yarrow
Crockett
Raney
Rollo
Coppell
Newton
Dale
McOwen
Gardhouse
Wigle
Middleboro
Hazen
Emerald
Nursey
Sothman
Halliday
Midlothian
Doon
Halcrow
Denyes
Swayze
Dore
Heenan
Marion
Rush L.
Genoa
Des Rosiers
Whalen
Carter
Stetham
Mattagami
Burrows
Keith
Mond
Raymond
Rankin
Merel
Greenlaw
Toomey
Cunningham
Garnet
Benton
Rice L.
Eric
Frater
Somme
Jack
Noble
Togo
Cabot
Kelvin
Natal
Knight
Van Hise
Haultain
Blamey
Fawn
Esther
Huffman
Potier
Neville
St. Louis
Groves
Brunswick
Eisenhower
Wakami
Hong Kong
Edith
Fingal
Arbutus
Yeo
Chester
Londonderry
11B
19
Champagne
10B
10A
Singapore
Ceylon
Cavell
Alcona
Smuts
Invergarry
Vrooman
Westbrook
Mattagami R.
Groundhog R.
Nat R.
Kapuskasing R.
Ivanhoe R.
0
8
16 mi.
0
Scale
26 km
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2
3
4
5
6
7
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Figure 6.2
TIMMINS
RESIDENT GEOLOGIST AREA

● **Exploration Activity, 1986**

● **Producing Mines, 1986**

3. Dome Mines Ltd. . . . . Au
4. Extender Minerals. . . . . barite

Falconbridge Limited (5 - 7)

5. Hoyle Pond Mine . . . . Au
6. Kidd Creek Mine . . . . . Cu, Zn, Ag, Pb, Cd, Sn
7. Owl Creek Mine . . . . Au

Pamour Porcupine Mines (8 - 10)

8. Pamour No. 1 Mine and No. 3 Pit. . . . . Au, Ag
9. Schumacher Property. . . . . Au, Ag
10. Timmins Property. . . . . Au, Ag

11. Steetley Talc Ltd.. . . . . talc

◒ **Mines and/or Properties Under Development, 1986**

12. Associated Porcupine Mines Ltd. and Quilio Resources Inc. Paymaster Property . . . . . . Au
13. Canamax Resources Inc., and Consolidated CSA Minerals Inc., Bell Creek Mine. . . . . . . Au
14. Canamax Resources Inc., and Bruneau Mining Corp., Clavos Property . . . . Au
15. Chesbar Resources Inc., and Murgold Resources Inc.. . . . . Au.
16. Davidson Tisdale Mines Ltd. and Getty Resources Ltd. . . . . Au
17. Diepdaume Mines Ltd., Preston Property . . . Au
18. Delbridge Mines Ltd., Desantis Property . . . . Au
19. Emerald Isle Resources Ltd., Kenty Property . Au
20. Noranda Exploration and Stan West Mining Corp., Desantis Property, Ogden. . . . . Au
21. Novamin Resources Inc., Rundle Property. . . Au
22. Pamour Inc., Delnite Property. . . . . Au
23. Pamour Inc., Porcupine Peninsular . . . . Au
24. St. Andrew Goldfields Ltd. . . . . Au
25. Vedron Ltd. and Belmoral Mines Ltd. . . . . . Au
26. Victoria Porcupine Resources Inc., Neybob Property . . . . Au
27. Wabigoon Resources Inc., Hunter Mine . . . . Au

TABLE 6.1: THE ESTIMATED GOLD PRODUCTION OF PAMOUR INCORPORATED IN 1986.

Minesite	Mine Production Tons (Tonnes)	Grade Oz.Au/Ton (G/Tonne)	Gold Produced Ounces (Grams)
Number One Mine: - Underground	635 000 (576 062)	0.07 (2.4)	38 672 (1 202 818)
Number One Mine: - #3 Open Pit	495 000 (449 056)	0.06 (2.1)	25 830 (803 683)
Schumacher Division:	240 000 (217 724)	0.076 (2.6)	15 868 (493 574)
Timmins Property: - Open Pit	205 000 (185 973)	0.109 (3.7)	19 440 (604 656)
Ross Division:	220 000 (199 581)	0.107 (3.7)	20 480 (636 993)
TOTAL	1 795 000 (1 628 396)	0.077 (2.6)	120 212 (3 741 724)

per ton). A total of 57 150 tonnes (62 997 tons) were processed at Pamour Incorporated's Schumacher mill on a custom basis until the end of May, 1986. In July and August, 15 400 tons (13 971 tonnes) were milled at Pamour's GOMILL with the remaining ore being milled at Asarco Exploration Company of Canada Limited's on-site mill at their Aquarius Deposit. Some higher grade material was treated at the company's own gold mill at their Hoyle metallurgical site. Pamour's Schumacher mill treated the ore in a conventional cyanide circuit whereas the other mills supplied a jig and float concentrate which was put through the company's copper smelter. The gold was then recovered in the copper refining process.

Mining was stopped at the pit in mid-June and was resumed in late 1986. Seventy thousand tons of waste were removed to prepare for production which is to begin again in early 1987.

In 1987, 170 000 tonnes (187 393 tons) will be mined and stockpiled. The ore will be treated for 2 months during the summer in a spare circuit in the base metal mill. A jig and float gold concentrate will be made and put directly into the smelter.

Mining at Owl Creek is down to the fifth bench (50 m below surface). A total of nine or ten benches will be mined. Remaining reserves are 609 000 tonnes grading 5 g/t gold (671 307 tons at 0.146 ounce per ton) (Falconbridge Limited, personal communication, 1986).

Hoyle Pond Mine

In 1986, its first full year in production, Falconbridge Limited's Hoyle Pond underground gold mine produced 90 000 tonnes (99 200 tons) grading 21 g/t gold (0.613 ounce gold per ton). Most of the ore came from development and stope preparation.

A total of 2245 m of both vertical and lateral underground development was done in 1986. The decline was driven down to the fourth level (211 m below surface). Nine cut and fill stopes, both mechanized and conventional, were started or were being prepared to start in late 1986. All stopes are above the second (120 m) level at present.

In 1986, 22 190 m of both surface and underground diamond drilling was completed.

Production in 1987 is forecast to be 95 000 tonnes (104 720 tons) grading 24 g/t gold (0.701 ounce gold per ton), 65 000 tonnes (71 650 tons) will be obtained from stopes and 30 000 tonnes (330 069 tons) from development. This will be mined at a rate of 300 tonnes (331 tons) per working day. Proven ore reserves are 400 000 tonnes grading 25 g/t gold (440 924 tons grading 0.73 ounce gold per ton) (Falconbridge Limited, personal communication, 1986).

Pamour Incorporated

The estimated gold production of Pamour Incorporated in 1986 is shown in Table 6.1.

The figures seen in Table 6.1 compare to the total 1985 figure where 1 445 000 tons (1 310 882 tonnes) were mined and milled at a grade of 0.079 ounce gold per ton (2.7 g/t) from which 100 715 ounces (3 132 587 g) gold were produced at a recovery rate of 87.3%. In 1985, 107 tons (97 tonnes) of copper were recovered from concentrate. The 1986 figures are unavailable.

Pamour Incorporated customed milled 63 000 tons (57 153 tonnes) of Falconbridge Limited's Owl Creek ore in 1986. The company also milled 50 000 tons (45 359 tonnes) in its GOMILL from the Owl Creek, Canamax Resources Incorporated's Bell Creek project, Davidson Tisdale Mines Limited/Getty Mines Limited Joint Venture and Sabin Brick. Pamour Incorporated received a $950 000 forgiveable loan from the provincial government toward the capital cost of this test mill which was completed in mid-1985. The total cost was $1.8 million. The mill's capacity is 300 tons (272 tonnes) per day.

In 1986, at the Number One Mine, 18 000 feet (5486 m) of underground development and stope preparation were completed, an increase of 50%

from 1985. In addition, 25 000 feet (7620 m) of underground drilling was done, an increase of 25% from 1985. Also, 28 000 feet (8534 m) of underground and 35 000 feet (10 668 m) of surface diamond drilling were done to expand the ore reserves at the Number Three Open Pit. Production from this low cost mining operation will increase to almost 50 000 tons (45 359 tonnes) per month. Pamour Incorporated made an agreement in early 1986 to acquire the long sought after Drew Claim from the Schumacher Estate. This claim lies in the middle of the Number One Mine mining property and contains 200 000 tons (181 437 tonnes) of indicated gold ore reserve grading 0.15 ounce gold per ton (5.2 g/t) above the 1400-foot (427 m) level. Development began immediately on this ore zone after the agreement was signed. Underground mining at Pamour No. 1 is mostly by longhole stoping using "In The Hole" drilling and "Vertical Crater Retreat" blasting. This takes place in the quartz stockwork in the conglomerate. Narrow vein mining is done in the volcanic rocks to the north.

At Pamour's Schumacher Mine, all mining is taking place above the 3800-foot (1158 m) level, mostly by salvage mining methods. Some longhole stoping is also being done. Drawpoints are driven into the bottom of old shrinkage stopes and sloughed ore is extracted. Some sloughing is induced by drilling and blasting. Development muck from previous activity was used as fill in some of these stopes. It has recently been discovered that the average grade of this muck is between 0.06 ounce and 0.07 ounce gold per ton (2.1 and 2.4 g/t). It is therefore economical at present gold prices to extract this material as ore and then to proceed with mining the walls of the shrinkage stopes. With the use of a wireline underground diamond drill, testing of the gold grade on both sides of the old sand-filled shrinkage stopes will take place. This will be done by drilling directly through these stopes from a single set-up. If the values are high enough, this sand will be removed and the stope walls mined.

In 1986, 4200 feet (1280 m) of underground development and stope preparation was done at the Schumacher site. Also completed was 25 000 feet (7620 m) of underground drilling.

In the summer of 1986, Pamour began a heap leach test. Two 10 000 ton (9072 tonne) stockpiles of ore, crushed to minus three-eighth inch, were placed on a polyethylene pad at the Number One minesite. One stockpile consisted of ore from the wacke horizon in the Number Three pit grading 0.037 ounce gold per ton (1.3 g/t). The other was from the Timmins Property and had a grade of 0.04 ounce per ton (1.4 g/t).

After 100 days (or 50 operating days) preliminary calculations indicated that a recovery of 68.4% had been achieved from the Number Three pit stockpile. The Timmins Property stockpile will be leached in 1987. The Ontario government, through NOR-DEV, provided a grant of $75 000 towards the project. This amounted to slightly less than 50% of the capital cost. A full report on the project will be made available to the public under the terms and conditions of the NOR-DEV agreement.

On the corporate level, Noranda Incorporated completed the sale of its 49% ownership of Pamour in early 1986. Jimberlana Minerals of Australia purchased 37.4% of the total shares. Pamour Incorporated purchased 19.6% of Giant Yellowknife Mines Limited in August, 1986. In October, 1986, Pamour sold to Giant Yellowknife all of its Timmins mining operations for cash and shares resulting in Pamour holding 50.1% of the total issued shares of Giant Yellowknife. Not included in the sale are Pamour's exploration properties and tailings areas which may be mined in a joint venture with ERG Resources. Also in late 1986, Pamour purchased 50.1% interest in Consolidated CSA Minerals Incorporated. CSA Minerals has a 50% interest in the Bell Creek Mine in Hoyle Township. Canamax Resources Incorporated owns the other 50% of the mine.

Pamour employs 760 people at its Timmins operations (Pamour Incorporated, personal communication, 1986; various articles, The Northern Miner, Timmins Daily Press, 1986).

Renabie Mine

The average rate of production in 1986 at the Renabie Mine in Leeson Township was 625 tons per day (567 t/day) at a grade of 0.201 ounce gold per ton (6.9 g/t). During the mine's fiscal year (October 1, 1985 to September 30, 1986), the mine produced 179 000 tons (162 386 tonnes) grading 0.211 ounce gold per ton (7.2 g/t).

By August, 1986, the mill had finished an expansion program to increase its capacity from 525 tons per day (476 t/day) to 700 tons per day (635 t/day). Mine production should be up to 700 tons per day in the spring of 1987.

All of the present mining activity is below the 3105-foot (946 m) level. The mining method is transverse sublevel caving with access by ramp below the 3105-foot (946 m) level. The lowest sublevel presently being developed is the sixth at the 3300-foot (1006 m) horizon. All production is taking place on the fifth sublevel or at 3265 feet (995 m) below surface. Ore is loaded by two yard scooptrams into underground trucks and then hauled 60 feet (18 m) above the 3105-foot (946 m) level, dumped into an ore pass, and then loaded by chutes into trolley cars on that level and trammed to the main shaft.

A winze was completed in 1986 from the 3105-foot (946 m) level to 4300 feet (1311 m) below surface, with 4245 feet (1294 m) to be the lowest working level. An ore pass was also completed for the winze and will be used for ore in 1987. This will save ore handling costs by eliminating the method previously described.

In 1986, 700 feet (213 m) of drifting were completed on both the 3510-foot (946 m) and the 3930-foot (1198 m) level from the new winze. An 18 000-foot (5486 m) diamond drill program was started in late 1986 from these levels with 6000 feet (1829 m) completed by the end of 1986, to expand and delineate ore reserves below 3510 feet (1070 m).

Proven reserves are 540 000 tons (489 880 tonnes) grading 0.20 ounce gold per ton (6.9 g/t) using a 0.15 ounce gold per ton (5.2 g/t) cut-off. This reserve is located in the "Main Zone" between the 3265- and 3720-foot (995 and 1134 m) horizon on the eastern side. Drilling the western side of the zone will take place soon.

The 1985/86 exploration program from the 1400-foot (427 m) level to explore the downward projected extension of the Nudulama gold zone failed to add reserves to the mine.

A 10 000-foot (3048 m) surface diamond drill program was completed in 1986 to test the postulated western extension of the "Renabie Break" into the volcanic rocks. (The ore host for the Renabie Mine is granitic rock.) A few narrow intersections containing gold values were obtained. Two structures trending eastward from the mine site into the granites will be drill tested in 1987. In 1986, 177 people were employed at the Renabie Mine (Renabie Mines Limited, personal communication, 1986).

Anglo Dominion Gold Exploration Limited and Canreos Minerals (1980) Limited

An agreement took effect on October 1, 1985, between Anglo Dominion Gold Exploration Limited, Canreos Minerals (1980) Limited, and Falconbridge Limited for the former two companies to supply 160 000 tons (145 000 tonnes) of gold-bearing flux to the latter's copper smelter over a two-year period. This ore is to come from the company's properties in Leeson and Brackin Townships. In 1986, approximately 32 380 tons (29 375 tonnes) will have been sent from the Anglo Dominion Property and 10 000 tons (9072 tonnes) from the Canreos Property. A total of 18 000 tons (16 329 tonnes) were shipped from the Anglo Dominion Property in 1985. The average grade of the ore was reported to be approximately 0.15 ounce gold per ton (5.2 g/t) with a silica content of 87%.

The ore from the Anglo Dominion Property has come from stockpiles which were derived from 1985 underground development and 1985 open pitting. Stockpiles from previous underground development by Nudulama Mines Limited were also shipped. In 1986, underground work consisted of test holing the walls of the two sublevels that were driven in 1985. An underground program proposed for 1987 includes driving the ramp to break into the Nudulama underground workings at the 150-foot (46 m) level and slashing the first and second sublevels which were driven in 1985 to the ore extremities. Slashing the 150-foot level of the old workings will also be done. Mining by vertical sublevel retreat will begin between the first and second sublevels in order to start supplying ore for 1987.

On the Canreos Property, 1270 feet (387 m) of underground ramping and 216 feet (66 m) of drifting on ore was done beneath the 21 vein open pit. A second bench was taken in the 21 vein pit. 16 105 feet (4909 m) of exploratory and definition surface diamond drilling was also done in 1986 (Anglo Dominion Gold Exploration Limited, and Canreos Minerals (1980) Limited, personal communication, 1986).

INDUSTRIAL MINERALS

Extender Minerals Limited

Underground development continued until June, 1986, on Extender Minerals Limited's barite deposit in southwestern Penhorwood Township. A decline ramp started in 1985 has been driven for a total of 610 m (2000 feet), reaching a vertical depth of 79 m (260 feet). At the 61 m (200-foot) level, the decline split and two headings were advanced to the northeast and southwest, paralleling the main vein zone for a total length of 91 m (300 feet). On the 55 m (180-foot) level, a loading station was cut and a crosscut driven into the main vein. A ventilation raise was driven from the crosscut on vein to surface. On the 70 m (260-foot) level, 9 box holes were driven up to the main vein in preparation for mining. A crosscut was driven to the main vein on this level and a second ventilation raise started on the vein. Approximately 460 m (1500 feet) of underground diamond drilling was completed in a series of short holes to delineate the main vein and a second vein located east of the decline. While diamond drilling the main vein, one hole intersected a third, previously unknown, barite vein, located approximately 55 m (180 feet) west of the main vein.

The estimate of reserves has been increased to 90 718.4 tonnes (100 000 tons) of high purity, white barite averaging 95% $BaSO_4$. A mill test of 226.8 tonnes (250 tons) of ore material, averaging 50% barite, was completed at the Extender Minerals Limited plant in Matachewan. Metallurgical testing is currently being carried out on the concentrate to reject silica, calcite, and white fluorite impurities. On surface, a settling pond has been constructed and foundations prepared for a wet jig table and screens, scheduled to be installed at the mine site in 1987. When production commences, the cleaned barite ore will be shipped to Matachewan for milling (Extender Minerals Limited, personal communication, 1986).

Steetley Talc Limited

In 1986, Steetley Talc Limited mined by open pit methods and stockpiled 200 000 tons (181 437 tonnes) of ore. Also during the year 35 000 tons (31 751 tonnes) of beneficiated talc were produced, the same amount as in 1985. The ore is mined and the talc concentrated at the mine site in Penhorwood Township. The concentrate is trucked to the company's fine-grind plant in Timmins. The product is sold to the pulp and paper, paint, cosmetic, plastics, and rubber industries.

Steetley Talc will complete a $42 million expansion by the end of 1987 which will bring the total talc producing capabilities at the company's facilities to 48 000 tons (43 545 tonnes) per year.

Steetley Talc Limited presently employs 52 full time and 6 part time people at its Timmins operations. In 1985, 50 full time people were employed (Steetley Talc Limited, personal communication, 1986).

TABLE 6.2: MAPS AND REPORTS PERTAINING TO THE TIMMINS RESIDENT GEOLOGISTS AREA PUBLISHED DURING 1986 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports	
OFR 5569	Rotosonic Drilling Operations and Overburden Heavy Mineral Studies, Matheson Area, District of Cochrane
OFR 5592	Geochronology of Ontario, Part 1: Compilation of Data
OFR 5615	Ontario Geoscience Research Grant Program, Grant No. 118: Surface Electromagnetic Mapping in Northern Ontario
OFR 5622	Ontario Geoscience Research Grant No. 202: Sulphur Isotope Studies of Archean Gold Deposits.
Studies	
Study 28	Talc, Magnesite and Asbestos Deposits of the Kirkland Lake - Timmins Area
Study 55	Chromite Deposits in Ontario
Miscellaneous Papers	
MP 123	Geology and Petrogenesis of the Archean Abitibi Belt in the Kirkland Lake Area, Ontario
MP 125	Exploration Technology Development Program of the Board of Industrial Leadership and Development, Summary of Research 1984-1985.
MP 128	Report of Activities 1985, Regional and Resident Geologists
MP 130	Geoscience Research Grant Program, Summary of Research 1985-1986
MP 132	Summary of Field Work and Other Activities 1986
Preliminary Maps	
P.2958	Gold Grains in Sonic Drill Samples, Lake Abitibi-Matheson Area
P.2983	Gold Grains in Backhoe Till Samples (1984-85), Matheson-Lake Abitibi Area
P.2986	Preliminary Results of Bedrock Samples from the Sonic Drilling Program in the Lake Abitibi-Matheson Area.
Geophysical/Geochemical Series Map	
MAP 80 784	Sonic Drillholes 84-30, Stock Township and 84-34, Taylor Township
MAP 80 785	Sonic Drillhole 84-31, Bond Township
MAP 80 786	Sonic Drillhole 84-32, Stock Township
MAP 80 787	Sonic Drillhole 84-33, Stock Township
MAP 80 788	Sonic Drillhole 84-35, Stock Township
MAP 80 789	Sonic Drillhole 84-36, Stock Township
MAP 80 790	Sonic Drillhole 84-37, Stock Township
MAP 80 793	Backhoe Till Samples, Stock, Taylor, Carr, Bowman and Sheraton Townships
MAP 80 795	Backhoe Till Sample, Clergue, Walker and Wilkie Townships
MAP 80 847	Sonic Drillhole 85-03 and 85-05, Clergue Township
MAP 80 848	Sonic Drillhole 85-04, Clergue Township
MAP 80 849	Sonic Drillhole 85-06, Clergue Township

TABLE 6.3 GOLD PRODUCTION TIMMINS RESIDENT GEOLOGIST'S AREA (TO THE END OF 1985)

MINE NAME	TOWNSHIP	YEARS OF PRODUCTION	TONS MILLED	OZ. PRODUCED	GRADE
Ankerite	Deloro	1926-1953,-78	4,993,929	957,292	0.19
Ankerite/March	Deloro	1926-1935	317,769	61,039	0.19
Aunor (Pamour No. 3)	Deloro	1940-	8,482,174	2,502,214	0.30
Banner	Whitney	1927-28,-33,-35	315	670	2.13
Bonetal	Whitney	1941-1951	352,254	51,510	0.15
Bonwhit	Whitney	1951-54	200,555	67,940	0.34
Broulan	Whitney	1939-53	1,146,059	243,757	0.21
Cincinnati	Deloro	1922-1924	3,200	736	0.23
Concordia	Deloro	1935	230	16	0.07
Coniaurum/Carium	Tisdale	1913-18, 1928-1961	4,464,006	1,109,574	0.25
Crown	Tisdale	1913-1921	226,180	138,330	0.61
Davidson	Tisdale	1918-1920	9,341	2,438	0.26
DeSantis	Ogden	1933,1939-42, 1961-1964	196,928	35,842	0.18
DeSantis	Turnbull	1926		13	
Delnite	Deloro	1937-1964	3,847,364	920,404	0.20
Dome	Tisdale	1920-	42,713,914	11,092,872	0.27
Faymar	Deloro	1940-1942	119,181	21,851	0.18
Fuller	Tisdale	1940-1944	44,028	6,566	0.15
Gillies Lake	Tisdale	1929-31,35-37	54,502	15,278	0.28
Goldhawk	Cody	1947	636	53	0.08
Halcrow-Swayze	Halcrow	1935	211	40	0.19
Hallnor (Pamour No. 2)	Whitney	1938-68,-81	4,226,419	1,645,892	0.39
Hollinger--Schumacher	Tisdale	1915-1918	112,124	27,182	0.24
Hollinger (Pamour Timmins)	Tisdale	1910-1968,	65,778,234	19,327,691	0.29
		1976-	2,069,200	141,235	0.07
Hoyle	Whitney	1941-44,46-49	725,494	71,843	0.10
Hoyle Pond	Whitney	1985-	74,028	27,550	0.37
Hugh-Pam	Whitney	1926,1948-65	636,751	119,604	0.19
Jerome	Osway	1941-43,1956	335,060	56,893	0.17
Joburke	Keith	1973-75,79-81	302,561	28,440	0.09
Kingbridge/Gomak	Chester	1935-36	1,387	98	0.07
McIntyre (Pamour Schumacher)	Tisdale	1912-	37,117,722	10,719,451	0.29
McLaren	Deloro	1933-37	876	201	0.23
Moneta	Tisdale	1938-1943	314,829	149,250	0.47
Naybob	Ogden	1932-1964	304,100	50,731	0.17
Owl Creek	Hoyle	1981-	1,029,328	116,360	0.12
Pamour No. 1 (Incl. #3 Pit)	Whitney	1936-	29,350,831	3,097,506	0.11
Paymaster	Tisdale	1915-1966	5,607,402	1,192,206	0.21
Porcupine Lake/Hunter	Whitney	1937-40,1944	10,821	1,369	0.13
Porcupine Peninsular	Cody	1924-27,-40,-47	99,688	27,354	0.12
Preston	Tisdale	1938-1968	6,284,405	1,539,355	0.24
Preston N Y	Tisdale	1933	2,800	153	0.05
Preston/Porcupine Pet	Deloro	1914-1915		314	
Preston/Porphyry Hill	Deloro	1913-1915	46	312	6.78
Reef Mine	Whitney	1915-1965	2,144,507	498,932	0.23
Renabie Mine	Leeson	1947-70,1982-	4,152,000	950,000	0.23 (EST.)
Tionaga/Smith-Thorne	Horwood	1938-1939	6,653	2,299	0.35
Tisdale Ankerite	Tisdale	1952	14,655	2,236	0.15
Tommy Burns/Arcadia	Shaw	1917	21	14	0.28-0.34
Vipond	Tisdale	1911-1941	1,565,218	414,367	0.26
TOTAL NO. OF MINES:	49				
TOTALS:			229,439,936	57,437,273	0.26

PROPERTY EVALUATION AND DEVELOPMENT

ASSOCIATED PORCUPINE MINES LIMITED/QUILL RESOURCES JOINT VENTURE

Both Associated Porcupine Mines Limited and Quill Resources have made an agreement by which Quill Resources will initially fund a $1.76 million surface diamond drill program on the former gold producing Paymaster Mine in Tisdale Township. If results are positive, a further $12.65 million may be spent on an underground development program and feasibility study for putting the mine back into production. Diamond drilling began in November, 1986, with two drills. Fourteen holes totaling 10 000 feet (3048 m) will be completed by the end of 1986 (The Northern Miner, October 6, 1986; E. Vukovich, geologist, personal communication, 1986).

CANAMAX RESOURCES INCORPORATED, BELL CREEK MINE

In November, 1986, Canamax Resources Incorporated announced that they and their 50:50 joint venture partner Consolidated CSA Minerals Incorporated will bring their Bell Creek Mine in Hoyle Township into production. A decision was also made to build a 350 tonne per day (386 ton/day) mill at the site. Total cost for the mill construction is estimated to be $4.6 million. Another $0.6 million is estimated to prepare a tailings area. Completion date is set for October 1, 1987. The mill can be readily expanded to 500 tonnes per day (551 tons/day) if the need arises.

In 1986, underground development included completing the shaft to 305 m, crosscutting 265 m on the second (120 m) level to the 'A' horizon of the northern zone, and drifting on vein for 200 m. Also, 238 m of crosscutting was done on the third (180 m) level to the 'A' horizon, with 300 m of drifting on vein. Crosscutting to ore was also started on the first (60 m) level. A vent raise is being driven from the third level to surface and an ore pass raise from the second to the fourth. A slot raise in ore has been driven from the third to the second level. By ramping from the second level, subdrifting 15 m above and 15 m below the level has been started.

The second level is being prepared for vertical sublevel retreat mining in the east-central part of the 'A' horizon. Shrinkage mining at the western end is being considered. Mine production is scheduled to start January, 1987. The initial ore produced may be milled at a custom facility until their own mill is ready.

The average width of the ore in the 'A' horizon of the northern zone is 2.8 m with the maximum width being 6 m. Proven and probable reserves here are 775 500 tonnes (854 842 tons) at a grade of 6.43 g/t gold (0.19 ounce per ton) using a 3 g/t and a 2 m cut-off. These reserves extend down to the 350 m level. The deepest drillhole intersected gold mineralization at 415 m below surface.

Approximately 8000 tons (7257 tonnes) of development ore was milled at Pamour Incorporated's GOMILL custom gold milling facility at their Schumacher Property in late 1986.

Extensive drilling over the last two years located three gold-bearing veins at the Marlhill Zone located 400 m to the north of the North Zone. Two zones, M1 and M2, are parallel, and the third, M3, crosscuts the other two. A decline has been started to evaluate and further explore this zone from underground. Present reserves for the three veins are 394 000 tonnes (434 311 tons) grading 7.99 g/t gold (0.234 ounce gold per ton).

If this zone is brought into production it will be mined underground from the shaft. Other possible reserves on the property include 136 000 tonnes (149 914 tons) grading 2.46 g/t gold (0.07 ounce per ton) for the 'B' horizon of the North Zone and 272 000 tonnes (299 829 tons) grading 4.1 g/t gold (0.12 ounce per ton) for the Bell Creek Zone.

The company believes that the North Zone is on the same stratigraphic horizon as the Owl Creek Mine and that the Marlhill zone occurs along the same stratigraphy as the Hoyle Pond Mine.

At the end of 1986, Canamax will begin phasing in its own staff to replace the contractors on the property. Seventy-five people are expected to be employed at the mine when the mill begins to process ore (Canamax Resources Incorporated, personal communication, 1986; The Northern Miner Magazine, October, 1986).

CANAMAX RESOURCES INCORPORATED, CLAVOS GOLD DEPOSIT

Since late 1984, Canamax Resources Incorporated and joint venture partner Bruneau Mining Corporation drilled over 160 diamond-drill holes along the westerly strike projection of the Clavos Gold Deposit in German Township. The "Discovery Zone" was initially discovered 300 m west of the original Clavos Zone. The "Extension Zone" was subsequently found another 400 m west of the "Discovery Zone". Seventy-three diamond-drill holes totaling 16 000 m were drilled in 1986.

To date, total drill indicated reserves for the "Discovery Zone" are 470 000 tons (426 377 tonnes) grading 0.21 ounce gold per ton (7.2 g/t gold). The mineralization discovered covers a strike length of 1800 m. Presently, fill-in drilling is being done to confirm the continuity of the mineralization between holes.

The gold mineralization occurs in zones of sericitic tuff containing disseminated pyrite, arsenopyrite, and irregular quartz ankerite stringers on both sides and adjacent to a felsic porphyry. These zones lie between argillaceous sedimentary rocks to the south and the Pipestone Fault Zone (sheared ultramafic rocks) to the north (Canamax Resources, personal communication, personal observation, 1986).

DAVIDSON TISDALE MINES LIMITED/GETTY RESOURCES LIMITED JOINT VENTURE

Getty Resources Limited was formed in 1986 to take over all of Getty Mines Limited's mineral interests in Canada ata cost of ten million dollars, included a 50% interest in the Davidson Tisdale Gold Deposit in Tisdale Township.

In April of 1986, a second underground development program, costing approximately $2 million, was slated to evaluate the gold deposit. Initially, slashing took place on the already established 300-foot (91 m) level. A raise was driven from the 500-foot (152 m) level to the 400-foot (122 m) elevation where a sublevel was established with 100 m of drifting and 25 m of crosscutting. A 15-m raise was driven from the 400-foot sublevel. Four thousand tons (3629 tonnes) of mineralized material was obtained from the above mentioned development plus from slashing on the 300-foot level and the 400-foot sublevel. Ninety-two underground diamond-drill holes and three surface diamond-drill holes totaling 2926 m were drilled for ore definition. No results are yet available for the above mentioned work; however, recalculated ore reserves after completion of the first underground program are 550 000 tonnes grading 8.74 g/t gold (606 400 tons at 0.255 ounce gold per ton) in the Main Shaft area and the Smith Vet area. All assays above 1.0 ounce gold per ton were cut to 1.0 ounce per ton. A cut-off grade of 0.1 ounce gold per ton was used.

Milling of 8000 tons (7257 tonnes) of mineralized development material was done at Pamour Incorporated's GOMILL. Four thousand tons was obtained from the 1985 underground program and 4000 tons from the 1986 program.

In late 1986, an underground decline was started. Underground diamond drilling will be done from the ramp to establish targets for crosscutting and then drifting on high grade zones. Raising on these zones will also be done to outline ore blocks (Getty Resources Limited, personal communication; personal observation, 1986; various articles, The Northern Miner Press, 1986).

DELBRIDGE MINES LIMITED

Delbridge Mines Limited dewatered the old Desantis Mine in Turnbull Township in early 1986. A compass and chain survey was done of the old underground workings. The workings were mapped geologically and sampled. A quartz vein along the drift was reported to have an irregular strike and a boudinage structure. Widths range from less than 1 cm to 3.5 m, the average being 0.6 m. Some gold values were found in shoots within the vein structure. Two other veins which were encountered in the old workings were mapped. No development work has been done on these. A surface program, planned for 1987 pending the availability of funds, will include a geophysical survey on the property as well as stripping and sampling on five other known gold occurrences. A surface diamond drill program may also be done (E. Gallo, consultant, personal communication, 1986).

DIEPDAUME MINES LIMITED

A 500 ton per day (454 t/day) mill has been constructed at the old Preston Mine property in Tisdale Township. Final preparation for start-up was being completed at the end of 1986 and it is expected that ore will start to be processed in early 1987. Initially, 10 000 tons of open pit gold ore from the Duncan Gold Resources Incorporated property in Tyrrell Township will be milled. Stockpiling of this ore was begun at Diepdaume in November, 1986. The mill will be available for custom milling of gold ore (Diepdaume Mines Limited, personal communication; personal observation, 1986).

NORANDA EXPLORATION COMPANY LIMITED/STAN WEST MINING CORPORATION JOINT VENTURE

Dewatering of the old underground workings of the Desantis Mine in Ogden Township was started in late 1986. Plans are being made to drive a drift which will be used as an underground drill base to evaluate the gold-bearing albitite horizon intersected from previous surface drilling. Surface diamond drilling on the mine property totaled 3500 m for nine holes. Drilling was done to test the albitite and other gold-bearing horizons at depth and along strike (Noranda Exploration Company Limited, Stan West Mining Corporation, personal communication, 1986)

PAMOUR INCORPORATED

Pamour Incorporated began dewatering the old Porcupine Peninsular Mine in Cody Township. Underground mapping, sampling, and diamond drilling will take place. Funding for the program will come from part of a $2.7 million flow-through financing Pamour received for a large-area gold exploration and evaluation program.

Pamour Incorporated stripped an area beside the old Deinite shaft in Deloro Township. Mapping and sampling were completed. The area was also sampled using a percussion drill (air trac). The area may be mined as a small open pit (Pamour Incorporated, personal communication; personal observation, 1986)

ST. ANDREW GOLDFIELDS LIMITED

In February, 1986, St. Andrew Goldfields Limited announced the acquisiton of additional property interests in Stock, Taylor, and Carr Townships near to their underground development in Stock Township. St. Andrew purchased all of the property interests of Labrador Mining and Exploration Company Limited in the area. Subsequently, St. Andrew entered into various joint venture agreements with it's affiliated company, Quebec Sturgeon River Mines Limited, and Esso Minerals Canada Limited. St. Andrew's new property interests total over 100 claims over and above its 100% owned mine property. These claims cover a 20 km segment of the Porcupine-Destor Fault area.

In May of 1986, St. Andrew Goldfields announced the discovery of a new mineralized gold zone just north of their underground workings on property in which St. Andrew has recently acquired a 75% interest. Esso Minerals Canada has the remaining 25%. Underground diamond drilling was done to explore north of what was originally considered to be the Porcupine-Destor Fault Zone (an area of highly sheared talc chlorite rock). This is now thought to be a splay off the main fault. What is now considered as the main fault was intersected by the drillholes further north. Between these two fault zones occur carbonatized ultramafic rocks in which there are felsic ("porphyry") dikes, veins, and fragments. These felsic bodies contain up to 10% disseminated euhedral pyrite and carry gold values.

The contact zone between the felsic bodies and the carbonatized ultramafic rocks also contains disseminated pyrite and carries gold values. This new zone, the N-2 Zone, has been drilled from the second (325-foot, 99 m) level, third (450-foot, 137 m) level, and the fourth (575-foot, 175 m) level. A total of 41 233 feet (12 568 m) of underground drilling has been done at St. Andrew's new property in 1986. Ninety percent of the drilling was carried out to delineate the N-2 Zone. A total of 1065 feet (325 m) of crosscutting to, and drifting within, the N-2 Zone was done on the third and fourth levels in 1986. The N-2 Zone has been delineated between the 200-foot (61 m) elevation to the 1000-foot (305 m) elevation. This zone plunges 40° to the southwest, the same as the rest of the gold zones in the mine.

Drill-indicated reserves on the N-2 Zone are presently 700 000 tons (635 029 tonnes) grading 0.20 ounce gold per ton (6.9 g/t) using a 0.1 ounce per ton (3.43 g/t) cut-off and cutting all assays above 1.0 ounce per ton to 1.0 ounce per ton.

Previously outlined reserves in the other 5 zones in the mine are 735 625 tons grading 0.135 ounce gold per ton (667 348 tonnes at 4.63 g/t). This can be upgraded to 525 626 tons at 0.170 ounce gold per ton (476 840 tonnes at 5.83 g/t) (St. Andrew Goldfields Limited, personal communication; personal observation, 1986; Toronto Stock Exchange Review, St. Andrew Goldfields, February, 1986).

VEDRON LIMITED/BELMORAL MINES LIMITED JOINT VENTURE

In April, 1986, Belmoral Mines Limited made an agreement with Vedron Limited to undertake a $2.3 million underground development program on the latter's gold deposit in the south-central part of Tisdale Township. This expenditure will earn Belmoral Mines $2.6 million Vedron flow-through shares. A 3500-foot (1067 m) ramp will be driven to 500 vertical feet (152 m) below surface. Underground drilling is planned and a 5000 ton bulk sample will be mined and tested at Belmoral's mill facilities in Quebec.

By the end of 1986, 1 km of new access road was built, a power line was installed, and two buildings were rehabilitated at the old Buffalo Ankerite Minesite for use as a shop and warehouse. A garage and compressor building were erected at the site. One thousand feet (3048 m) of ramping was completed and access gained to the first (160-foot, 49 m) level of the old Edwards Mine workings. The old shaft was dewatered and 2000 feet (610 m) of underground diamond drilling were completed, out of a scheduled 10 000-foot (3048 m) program. The property has inferred reserves of 1 million tons grading 0.20 ounce gold per ton (907 185 tonnes at 6.86 g/t) to the 1600-foot (488 m) level. It is hoped that the underground program will outline 500 000 tons (453 592 tonnes) of ore grading over 0.20 ounce gold per ton (6.86 g/t) (Vedron Limited, Belmoral Mines Limited, personal communication, 1986; various articles, The Northern Miner, 1986).

VICTORIA PORCUPINE RESOURCES INCORPORATED

A 28-hole, 11 000-foot (3353 m) diamond drill program was completed by Victoria Porcupine Resources Incorporated on the old Naybob (Kenilworth) Mine property in Ogden Township in 1986. The target area was the "sulphide" horizon at the southern side of the mine workings. Some mining was done in this area previously; however, most of this earlier mining activity took place in the carbonatized komatiitic rocks to the north. Parallel to subparallel sericitic, carbonatized, siliceous zones, containing up to 10% pyrite and arsenopyrite, were intersected in altered basalt, occasionally in contact with porphyry bodies. Some gold intersections of economic significance were reported. Prior to the drill program, trenching, surface geological mapping, and a geophysical program were carried out (David R. Bell Geological Services, personal communication, 1986).

WABIGOON RESOURCES INCORPORATED

Subsequent to a small underground program on the old Hunter Mine in Whitney Township in 1985, Wabigoon Resources Incorporated conducted a winter diamond drill program totaling 15 000 feet (4572 m) from the ice on Porcupine Lake in 1986. Narrow gold intersections were obtained in altered ultramafic rocks located north of the shaft at 500 feet (152 m) below surface. Strike length is 1450 feet (442 m).

Assuming that the vein was continuous, an average grade of 0.223 ounce gold per ton (7.65 g/t) was calculated for a mining width expanded (diluted) to 5 feet. A drill-inferred tonnage was estimated to be 500 000 tons (453 592 tonnes) grading 0.223 ounce gold per ton (Wabigoon Resources, personal communication; personal observation, 1986; various Northern Miner articles, 1986).

EXPLORATION ACTIVITY

Exploration activity in the Timmins Resident Geologist area remained high in 1986. Almost all of the effort was placed on gold exploration. Only five companies had minor programs for base metals. Toward the end of 1986, some interest was expressed in platinum exploration in areas along the ultramafic body in Mann and McCart Townships; the ultramafic body in Massey, Whitesides, and Turnbull Townships; and the ultramafic rocks in Adams, Eldorado, Langmuir, and Carman Townships. The only new and very significant mineral discovery in 1986 in the Timmins Resident Geologist area was by the Falconbridge Limited/Syngold Exploration Incorporated joint venture in Hoyle Township. Spectacular gold intersections were obtained in two drillholes south and west of the Owl Creek Gold Mine.

Some of the projects carried out in 1986 in that part of the Abitibi Belt which lies within the Timmins Resident Geologist's area are briefly described below.

FALCONBRIDGE LIMITED

Falconbridge Limited was definitely the most active explorer in the Timmins area in 1986. Diamond drill programs were carried out in 13 townships and re-

TABLE 6.4: BASE METAL PRODUCTION: TIMMINS RESIDENT GEOLOGIST'S AREA (TO THE END OF 1985)

Mine	Township	Dates	Ore Milled (Tonnes)	%Cu	%Zn	%Ni	Ag (G/Tonne)	Au
Alexo	Dundonald	1912-19 1943-44	51 529	0.07		3.93		
Canadian Jamieson	Godfrey	1966-71	434 409	2.39	4.05			
Jameland	Jamieson	1969-72	461 805	0.99	0.88		3.5	0.05
Kam Kotia	Robb	1943-44 1961-72	6 007 194	0.09	1.03		3.5	0.05
Kidd Creek Mine	Kidd	1965-	67 963 074	1.92	7.61		116.1	
Langmuir	Langmuir	1973-77	997 903			1.5		
McIntyre	Tisdale	1963-81	10 162 640	0.62			0.09	0.023
United Obalski	Godfrey	1965-66	Data Unavailable					

verse circulation drill programs in seven townships. Eighty-four percent of the company's diamond drilling was for gold exploration, the other 16 percent was directed to base-metal exploration. Total diamond drilling was 148 holes (44 910 m). Sixty-six percent of the reverse circulation footage was for gold exploration, the other 34 percent was for base metals. A total of 206 reverse circulation holes were drilled.

Base-metal exploration diamond drilling was carried out in: Carscallen Township (4 holes, 1000 m), Godfrey Township (7 holes, 3468 m), Kidd Township (10 holes, 2716 m), and Macdiarmid Township (1 hole, 280 m).

Exploratory diamond drilling for gold was carried out in: Deloro Township (6 holes, 1395 m), Cody Township (6 holes, 1747 m), and Thorneloe Township (3 holes, 871 m) on properties optioned from Comstate Resources Limited. Gold exploratory drilling was also carried out in: Lucas Township (4 holes, 1763 m) which included some exploration drilling in a joint venture with Mariner Explorations Incorporated; Macklem Township (3 holes, 935 m) on claims optioned from United Kingdom Energy Incorporated; Matheson Township (15 holes, 3250 m) in a joint venture with Umex Incorporated; Tully Township (10 holes, 2124 m) some of which was on claims optioned from Hanson Mineral Exploration Limited; Wark Township (3696 m); and Hoyle Township (76 holes, 24 664.9 m).

In Hoyle Township 10 000 m were drilled by Falconbridge Limited just south and west of the Owl Creek Gold Mine in a joint venture with Syngold Explorations Incorporated. Results of two holes were reported in December, 1986. One hole returned an assay of 0.18 ounce gold per ton (6.17 g/t) over a core length of 173.9 feet (53 m) which included a section of 0.32 ounce gold per ton over 78.7 feet (10.97 g/t over 24 m). Another hole, drilled 150 feet (46 m) to the east and 150 feet below the previously mentioned hole, returned an intersection grading 0.24 ounce gold per ton over a core length of 36.1 feet (8.3 g/t over 11 m) (Falconbridge Limited, personal communication, 1986).

NORANDA EXPLORATION COMPANY LIMITED

In the past three years, Noranda Exploration Company Limited has diamond drilled 115 000 feet (35 052 m) including 65 000 feet (19 812 m) drilled in 1986 on their "Mountjoy" project in Mountjoy, Ogden, and Deloro Townships. The objective of the program was to locate and evaluate favourable structure and stratigraphy to the west of the gold-bearing horizon on which the old Buffalo Ankerite, Aunor, and Delnite Mines are located. Considerable work was done on the old Desantis Mine property under a joint venture with Stan West Mining Corporation. The 1985 program is summarized in Luhta *et al.* (1986, p.173); the 1986 program is described under Property Evaluation and Development above.

A large gold-bearing quartz stockwork with a strike length of 4000 feet (1219 m) has been discovered in the northern part of Deloro Township adjacent to the Deloro-Ogden Township boundary. Widths of up to 125 feet (38 m) have been intersected. Core lithologies observed included carbonatized ultramafic rocks and iron- and magnesium-rich altered tholeiitic rocks adjacent to the quartz zone. This zone contains over 30% quartz-carbonate veins and stringers with black tourmaline in a grey-brown foliated sericitized-carbonatized rock. Abundant disseminated pyrite occurs throughout. Narrow, erratically distributed gold intersections were obtained throughout the zone.

In a joint venture with GoWest Amalgamated Resources Limited, Noranda Exploration drilled two holes (2000 feet, 1610 m) just west of Moose Lake in Bond Township. The holes were drilled to locate the source of anomalous gold values in till found in a previous overburden drill program. No positive results were obtained (Noranda Exploration Company Limited, personal communication, personal observation, drill core, 1986).

DOME EXPLORATION (CANADA) LIMITED

Dome Exploration (Canada) Limited was actively involved in gold exploration in the Timmins area in 1986. Twelve holes (2438 m) were drilled in 1986 as part of a 22-hole program which began in 1985 in the western part of Bristol Township. Most of the holes

TABLE 6.5 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM	--Airborne electromagnetic survey	EM	--Electromagnetic survey	Pros	--Prospectus
Ag	--Silver	Expnd.	--Expenditures	Rad	--Radiometric survey
AMag	--Airborne magnetic survey	GC	--Geochemical survey	Rtr	--Trenching
ARes	--Airborne resistivity survey	GL	--Geological survey	SA	--Sampling, Assays
Au	--Gold	HLEM	--Horizontal loop electromagnetic survey	SP	--Self-potential survey
AVLF	--Airborne VLF-EM survey	IP	--Induced polarization survey	Str	--Stripping
BM	--Base Metals	Mag	--Magnetic survey	T-mgst	--Talc-magnesite
BS	--Beneficiation Studies	Man	--Manual labour	U/G wrk	-Underground work
CS	--Core Samples	Mech	--Mechanical work	UTEM	--University of Toronto EM survey
Cu	--Copper	OVD	--Overburden drilling	VLF	--Very low frequency EM survey
DD	--Diamond Drilling			Zn	--Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Arbutus,Benton, Champagne,Chester, Esther,Fingal,Groves, Huffman,Benneweis, Marion,Mallard, Neville,St. Louis, Potier,Osway,Yeo	41O/16E, 12E,41O/9	Blue Falcon Mines	Au	Assess.	AMag,AVLF	1985	2.8566	T-3020
Benton	41O/9NW	Wesco Resources	Au,BM	Assess.	AMag,AVLF	1985	2.8898	T-3054
			Au	Assess.	GL	1985-86	2.9130	T-3054
Benton, Mallard	41O/9	Noranda Exploration	Au	Assess.	DD-4-696m	1985		T-2305
Bond	42A/7NE, 10SE	Noranda Exploration	Au	Assess.	OVD-23-900.4m	1984	2.9080	T-2857
		Westmin Resources	Au	Assess.	DD-1-229m,CS	1985		T-2440
Bond, Sheraton	42A/7NE	Sumach Resources	Au	Assess.	AMag,AVLF	1985	2.8711	T-3018
Brackin	42B/5SW	Armistice Resources	Au	Assess.	DD-6-411.5m	1985		T-2939
		Aurelian Development	Au	Assess.	GC,GL,Assays	1985	2.8949	T-2939
				Assess.	Assay Expnd.	1986	2.9321	T-2939
		Canreos Minerals	Au	Assess.	DD-2-261.2m	1986		T-2797
Bristol	42A/5NE	Ralph Allerston	Au	Assess.	Man,Mech	1985		T-1610
				Assess.	Mag,HLEM	1986	2.9436	T-3075
	42A/5NE	Cominco Ltd.	Au	Assess.	VLF	1986	2.9463	T-3084
	42A/6NW	Dome Exploration	Au	Assess.	DD-2-337m	1984		T-2944
	42A/5NE,6NW	Utah Mines Ltd.	Au	Assess.	DD-2-427m	1985		T-2927
				Assess.	GL,GC	1985	2.8733	T-2927
				Assess.	DD-1-303.9m	1986		T-2927
				Assess.	IP	1984-85	2.8666	T-2927
	42A/5NE	Westfield Minerals	Au	Assess.	GC,VLF	1985	2.8601	T-2938
Bristol, Carscallen	42A/5NE	Esso Resources	Au,BM	Assess.	GL	1985	2.9012	T-3047
				Assess.	DD-3-489.6m	1986		T-3047
Brower, Pyne, Fox	42A/15W	Asarco Exploration	Au	Assess.	OVD-21-1292m	1986	2.9540	T-3087
Carman	42A/6NE	E. Guy	Au	Assess.	Mag,VLF	1985	2.9210	T-2743
				Assess.	GC,Assays	1985	2.9208	T-2743
				Assess.	GL	1985	2.9209	T-2743
	42A/6NE	M. Kean Resources	Au	Assess.	Assays	1985	2.8936	T-2974
				Assess.	Assays	1986		T-2974
				Assess.	Assays	1986	2.9347	T-2974
Carman, Langmuir	42A/6NE	N K Gold Prospect	Au	Assess.	GL	1985	2.8810	T-2974
Carscallen	42A/5NE	Esso Resources	Au,BM	Assess.	GL	1985	2.9128	T-3047
		Kidd Creek Mines	Au	Assess.	HLEM,VLF,Mag	1985	2.9102	T-2865

TABLE 6.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Chester	41P/12NW	Emerald Isle Res.	Au	Assess.	Str, Mech	1985		T-2994
				Assess.	GL	1985	2.8663	T-2994
		Kidd Resources	Au	Assess.	Str,Mech	1986		T-2946
Clergue	42A/10N	D. McKinnon	Au	Assess.	Mag,VLF	1985	2.8770	T-2399
		Arvo Salo	Au	Assess.	Mag	1986	2.9167	T-2759
Cody	42A/11SE	Cody Hawk Resources	Au	Nonassess.	Pros	1983		T-3064
		Falconbridge Ltd.	Au	Assess.	VLF,Mag	1986	2.8841	T-3027
				Assess.	GL	1986	2.9294	T-3027
	42A/6NE	Kidd Creek Mines	Au	Assess.	DD-2-427m	1986		T-3066
	42A/10SW	J.P. Sheridan	Au,Ag,Cu,Zn	Assess.	DD-1-307.1m, CS	1985		T-3010
			Au,Ag,Cu,Zn	Assess.	Assays	1985	2.8785	T-3010
Cody, Matheson	42A/10SW, 11SE	Falconbridge Ltd.	Au	Assess.	DD-2-524.3m	1986		T-3055
Cote	42A/12SW	Mountain Frontier	Au	Assess.	DD-11-607m	1985		T-2972
Cunningham	41O/10NE	R.A. MacGregor	Au	Assess.	Assays	1982-83	2.8979	T-2512
Cunningham, Swayze	41O/15SE	Quinterra Resources	Au	Assess.	DD-14-2136.6m	1985		T-2649
Deloro	42A/6	Comstate Resources	Au	Assess.	GL	1985	2.8601	T-2809
		Diepdaume Mines Ltd.	Au	Assess.	Man	1985		T-2498
				OMEP	U/G Wrk,Assays	1983	63.4291 OM83-5C-8	T-2498
		Diplomat Resources	Au	Assess.	Man,Str	1985		T-2986
		Falconbridge Ltd.	Au	Assess.	Str	1985		T-2809
				Assess.	DD-6-1400.9m	1986		T-3063
		L.S.L. Rich Gold Mn.	Au	Assess.	Man,Assays	1985	2.8515	T-2981
				Assess.	DD-3-143.3m	1986		T-2981
		R. Meunier	Au	Assess.	Man	1985		T-2760
		J.A. Mortson	Au	Assess.	Mag,VLF	1985	2.8693	T-3017
		Pamour Porcupine	Au	Assess.	DD-8-591.3m	1985		T-2544
				Assess.	Str	1986		T-2544
		J.P. Sheridan	Au	Assess.	Assay Expnd.	1985	2.8873	T-2811
				Assess.	VLF	1986	2.9039	T-2811
				Assess.	Str	1986		T-2811
				Assess.	Assays	1986	2.9344	T-2811
Denton	42A/5SE	Golden Range Res.	Au	Assess.	DD-3-166m	1985		T-2897
Denyes,Greenlaw, Cunningham	41O/15SE	Folkestone Resources	Au	Assess.	GL	1985	2.8439	T-2656
Dublin	41P/4SE	J. Brady	Au,BM	Assess.	Man,Str	1986		T-2761
		Dumont Exploration	Au,BM	Assess.	GL	1986	2.9227	T-3068
Duff	42A/14SE	BP Resources/Selco	Au,BM	Assess.	EM	1985	2.8653	T-2933
Dundonald, Evelyn	42A/10NW	Angela Developments	Au,BM	Assess.	AMag,AVLF	1984	2.9098	T-2744
Dundonald, German	42A/10W	Kengold Resources	Au	Assess.	DD-3-560.8m	1986		T-2999
				Assess.	VLF,Mag	1986	2.9117	T-2999
Evelyn	42A/10N	Cominco Ltd.	Au	Assess.	DD-52-1714m	1984-85	2.8647	T-2885
				Assess.	DD-4-1755.3m	1983-84		T-2885

TABLE 6.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Fallon	42A/3NE,2NW	D. Meunier	Au	Assess.	UTEM	1984	2.7936	T-2596
				Assess.	OVD-10-143.0m	1985	2.8776	T-2596
				Assess.	OVD-55-561.3m	1985	2.9079	T-2596
				Assess.	OVD-98-1285.4m	1985	2.9279	T-2596
				Assess.	OVD-90-744.1m	1986	2.9396	T-2596
				Assess.	DD-2-466.4m	1986		T-2596
Fortune	42A/12SW	Brett B. Davis	Au	Assess.	Rtr,Str	1984		T-3012
		Ivan J. Dea	Au	Assess.	Mech	1986		T-3071
Fripp	42A/6SW	R. Murphy	Au	Assess.	Mag,VLF	1986	2.9064	T-3049
Garnet	41O/9NW,	Western Pacific	Au	Assess.	DD-14-1716m	1985-86		T-2969
	10NE	Energy		Assess.	Assays	1985-86	2.9200	T-2969
				Assess.	Str,Rtr	1986		T-2969
German	42A/10SW	Asarco Exploration	Au	Assess.	Mag,VLF	1986	2.9109	T-2824
		Canamax Resources	Au	Assess.	DD-1-222m	1986		T-2902
		A. Salo	Au	Donated	Mag Plan	1984		T-3074
		J.P. Sheridan	Au	Assess.	VLF	1986	2.8992	T-2662
German, Stock	42A/10SW	Bruneau Mining	Au	Assess.	DD-1-162m	1986		T-2864
Godfrey	42A/5NE	Esso Resources	BM	Assess.	Str,Rtr	1985		T-3004
		Kidd Creek Mines	BM	Assess.	Mag,VLF,HLEM	1985	2.8818	T-2613
				Assess.	Mag,VLF,HLEM	1985	2.8822	T-2613
				Assess.	Mag,VLF,HLEM	1986	2.8968	T-2613
				Assess.	Str	1986		T-2613
		Kidd Creek Mines/	BM	Assess.	Mag,VLF,HLEM	1986	2.9531	T-3085
		Esso Resources						
	42A/12SE	Tamarack Prospecting	Au,BM	Assess.	GL	1985	2.8922	T-3040
Greenlaw	41O/10N	Folkestone Resources	Au	Assess.	Assay,GC	1985	2.8934	T-2636
		Grangex Expln. AB	Au,Ag,BM	Assess.	GC	1985	2.8650	T-1997
			Au	Assess.	GC	1985	2.8451	T-1997
		Greyhawk Res. Ltd.	Au	Assess.	GL,GC	1985	2.8764	T-3041
		Noranda Exploration	Au,BM	Assess.	DD-5-667.1m	1985		T-2854
		Noranda Exploration/						
		Kirkland Resources	Au,BM	Assess.	DD-1-205m	1985		T-2853
Greenlaw,Cunningham	41O/10NW	Noranda Exploration	Au,BM	Assess.	Assays	1984	2.9170	T-2854
Groves	41P/12SE	Canadian Gold Res.	Au,Ag	Assess.	DD-6-637.8m	1985-86		T-3067
Halcrow, Tooms,	41O/10N,	Quinterra Resources	Au,BM	Assess.	OVD-82-1066m	1985-86	2.9037	T-2493
Greenlaw	15SW							
Heenan	41O/16SW	Hillrock Dev. Corp.	Au	Assess.	Soil GC	1985	2.8720	T-3030
Heenan, Marion	41O/16SW	Falconbridge Ltd.	Au	Assess.	Str	1985		T-2345
				Assess.	Assay Expnd.	1985	2.8843	T-2345
Hillary	42A/5NW	Gauthier Property	Au	Assess.	Assays,Man	1986		T-3001
Horwood	42B/1SW,	Ultrex Petroleum	Au	Assess.	GL,Mag,IP,EM	1985	2.8511	T-2891
	41O/16NW	R. Wdowczyk	Au	Assess.	Man,Str	1985		T-2424
Hoyle	42A/11SE	Asarco Exploration	Au	Assess.	OVD-6-168.8m	1986	2.9411	T-3073

TABLE 6.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hoyle, Wark	42A/11E	A. Delo	Au,BM	Donated	AMag	1986		T-3063
				Assess.	AMag,AVLF	1986	2.9165	T-3063
Jamieson	42A/12SE	Kidd Creek Mines	Au	Assess.	Str	1985		T-2660
				Assess.	Mag	1986	2.9431	T-2660
Jessop	42A/11SW	Kidd Creek Mines	BM	Assess.	HLEM,Mag	1985	2.8979	T-2477
Keefer	42A/5E	F. Galeta	Au	Assess.	Mech	1985-86		T-1556
		Noranda Exploration	Au	Assess.	OC	1985	2.8469	T-2924
				Assess.	Mag,VLF	1986	2.9496	T-2924
Keith	42B/1E	Gall Resources	Au	Assess.	Str,Man	1985		T-2776
				Assess.	GL	1985	2.9442	T-2776
		G.K. Sanford	Au	Assess.	RR	1984	2.7669	T-2823
Keith, Muskego	42B/1E	Utah Mines Ltd.	Au	Assess.	DD-9-1296m	1986		T-2891
Kenogaming	42A/4NW	Carl Creek Resources	Au	Assess.	Assay Expnd.	1985	2.8619	T-2793
		Golden Range Res.	Au,BM	Nonassess.	Str,Rtr	1984		T-2751
				Assess.	GL,OC,Str,IP, Sampling	1984-85	2.8587	T-2751
				Assess.	DD-4-619m	1984		T-2751
		Baba Resources Ltd.	Au	Assess.	GL	1985	2.8438	T-2830
				Assess.	GL	1985	2.9039	T-2830
Kidd	42A/11NW	Kidd Creek Mines	Au,BM	Assess.	DD-1-200m	1986		T-2755
Langmuir	42A/7SW	Dome Exploration	Au	Assess.	Mag	1986	2.9052	T-2897
	42A/6SE	D. Meunier	Au	Assess.	Mag,VLF	1985	2.8489	T-2951
Langmuir,Blackstock, Pallon,Pasken	42A/7SW	Dome Exploration	Au	Assess.	Mag	1985-86	2.8971	T-2897
Langmuir,Blackstock	42A/7SW	Dome Exploration	Au	Assess.	Mag	1985,86	2.9230	T-2897
Langmuir, Pallon	42A/6SE	D. Meunier	Au	Assess.	DD-4-715.9m	1986		T-2951
Lawson	42B/5W	Arctic Red Resources	Au	Assess.	AMag,AVLF	1986	2.8981	T-3052
		North Goldfields	Au	Assess.	Str,Rtr	1985		T-3024
			Au	Assess.	Ren	1985		T-3024
Lennox	42H/3SW	Kidd Creek Mines	Au	Assess.	OVD-1-39m	1984	2.9033	T-2836
Lucas	42A/14	Kidd Creek Mines	Au	Assess.	OVD-7-180.7m	1985	2.8933	T-2949
				Assess.	HLEM,Mag	1986	2.9320	T-2949
McArthur	42A/3NW	R. Lavoie Property	Au	Assess.	VLF	1985	2.8595	T-3016
McKeown	42A/3NW	Nicholls Property	Au	Assess.	Str,Rtr	1985		T-3011
Macdiarmid	42A/11NW	Kidd Creek Mines	Au	Assess.	OVD-4-157.4m	1986	2.9266	T-2899
Macklem	42A/7NW	Hilton Resources	Au	Assess.	Mag	1985	2.8749	T-3037
				Assess.	OVD-9-242.6m	1986	2.9558	T-3037
	42A/10SW	Pamour Porcupine	Au	Assess.	Mag,EM	1985	2.8707	T-2313
		United Kingdom Energy	Au	Assess.	OVD-20-926m	1985	2.8662	T-2736
Macklem, Cody	42A/7NW	Pamour Porcupine	Au	Assess.	Mag,VLF	1986	2.9153	T-1573
Mallard	41O/9E	Wesco Resources Ltd.	Au,BM	Assess.	AVLF,AMag	1985-86	2.9008	T-3050
Mann	42A/14SE, 15SW	Noranda Exploration	Au	Assess.	AMag	1972	2.9094	T-3044
Mann, Little	42A/15E	Noranda Exploration	Au	Assess.	AMag	1985	2.9129	T-3044

TABLE 6.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Matheson	42A/10SW	Cleyo Resources	Au	Assess.	EA	1985	2.8874	T-3039
		Cominco Ltd.	Au	Assess.	DD-2-327m	1985		T-2403
	42A/11SE	Pamour Inc.	Au	Assess.	Mag	1986	2.9437	T-2984
Moen	41O/5SW	Noranda Exploration	Au	Assess.	GL	1985	2.8868	T-2837
				Assess.	Mag,HLEM	1984	2.9207	T-2837
Moggy	41O/5SW	Noranda Exploration	Au	Assess.	GL	1985-86	2.9469	T-2837
Moggy, Neill	41O/5SE	P.L. Prankow	Au	Assess.	AMag,AVLF,ARes	1986	2.9126	T-3060
Mountjoy	42A/11SW	Cometate Resources	Au	Assess.	DD-7-1042m	1986		T-2526
		Cometate Resources/ D.R. Pyke	Au	Assess.	CS,Assays	1986		T-2526
Mountjoy, Jessup, Jamieson, Godfrey	42A/5SW	E-3 Development & Mining	Au	Assess.	DD-1-242.9m	1986		T-2887
				Assess.	DD-1-92.9m	1985		T-2887
Murphy, Hoyle	42A/11SE	Canamax-Bell Creek	Au	OMEP	Assays,IP,EM, DD-47-9425.9m, Mag	1983	OM82-5JV-151	T-2787
Muskego, Keith	42B/1NW	Utah Mines Ltd.	Au	Assess.	Mag,VLF	1985	2.8613	T-2991
				Assess.	Mag,VLF	1985-86	2.8811	
				Assess.	GC	1985	2.8556	
Neill	41O/5SE	Glen Auden Resources	Au	Assess.	AMag,AEM,ARes	1986	2.8994	T-3015
		Verna Lake Mines	Au	Assess.	Str	1985		T-3015
Ogden	42A/6NW	Logan Porcupine	Au	Donated	Petrographic Analyses	1986		T-148
		Noranda Exploration	Au	Assess.	DD-4-1048.8m	1985		T-3013
				Assess.	OVD-2-22.3m	1985	2.8875	T-3025
				Assess.	DD-2-507.2m	1986		T-2801
				Assess.	Mag,VLF	1986	2.9169	T-2801
Osway	41O/9SW	Hargor Resources	Au	Assess.	DD-3-230.4m	1986		T-2517
Ottaway, Fournier	42A/14NE	Chevron Canada Res.	Au	Assess.	AMag,AVLF	1986	2.9076	T-3045
Penhorwood	42B/1NE	W.O. Karvinen and Associates	Au	Assess.	Mag,IP,VLF,HLEM	1986	2.9368	T-3005
		Manville Canada Inc.	Au	Assess.	EM,Rad	1984-85	2.9443	T-2959
		Utah Mines Ltd.	Au	Assess.	Str	1986		T-3076
Pharand	42A/4NE	Magenta Development	Au	Assess.	GL,GC	1985	2.8646 2.9082	T-3052
				Assess.	Mag,VLF	1986	2.9501	T-3052
Price	42A/6SW	A.J. Amory	Au	Assess.	Assay Expnd.	1984	2.8402	T-2980
		Argentex Resources	Au,BM	Assess.	DD-6-916.5m	1986		T-2431
Price, Thorneloe	42A/6SW	Crosall/Kangas Prop.	Au	Assess.	Str,Str,Mech	1986		T-3086
Raney	41O/15SW	J-Mex Mining and Exploration	Au	Assess.	GL	1984	2.8380	T-[illegible]
Raney, Rollo	41O/15SE	Carlson Mines Ltd.	Au	Assess.	Str	1985		T-2639
				Assess.	AVLF,AMag	1985	2.9419	T-2639

TABLE 6.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Reid	42A/12NE, 13SE	Kidd Creek Mines	BM	Assess.	Str	1985		T-3022
				Assess.	HLEM,VLF,Mag	1985-86	2.9073	T-3043
				Assess.	GL	1985	2.9086	T-3063
				Assess.	GL	1986	2.9309	T-3043
Robb	42A/12	Asarco Exploration	Au	Assess.	GL	1985	2.8673	T-2958
		Steller Resources	Au	Assess.	EM,Mag,IP	1985	2.9387	T-2655
Robb, Cote	42A/12SE	Asarco Exploration	Au	Assess.	OVD-10-196.9m	1986	2.9034	T-2958
				Assess.	OVD-10-237.1m	1986	2.9425	T-2950
Rollo	41O/15SE	Carlson Mines	Au	Assess.	Str	1985		T-2639
				Assess.	GC Assays	1983	2.8141	T-2639
		Hanson Lake Res.	Au	Assess.	AMag,AVLF	1985	2.8952	T-2963
		Ingamar Exploration	Au	Assess.	Str	1985		T-3059
		Kenty Resources	Au	Assess.	AMag,AVLF	1985	2.8952	T-2731
		Rollo Resources	Au	Assess.	AMag,AVLF	1985	2.8952	T-3058
		Rollover Resources	Au	Assess.	AMag,AVLF	1985	2.8953	T-3057
Sewell	42A/4NW	R.U. Tremblay	Au	Assess.	DD-5-777.5m	1986		T-2971
Shaw	42A/6NE	R. Allerston	BM,T-mgst	Assess.	Str,Mon,Mech	1986		T-1200
Shaw, Deloro	42A/6NE	Diplomat Resources	Au	Assess.	Mech	1985		T-2966
Shaw, Whitney	42A/6NE	Chevron Minerals	Au	Assess.	OVD-105-1707.2m	1986	2.9205	T-3069
Sheraton	42A/7N	Lac Minerals	Au	Assess.	Mag	1986	2.9247	T-3002
Silk, Norwood	41O/16NW	J. Gravely	Au,BM	Assess.	AMag,AVLF	1986	2.9186	T-3056
Stock	42A/10SW	Cominco Ltd.	Au	Assess.	Mag	1985	2.8808	T-2762
				Assess.	DD-1-152m	1985		T-2742
				Assess.	HLEM,Mag	1986	2.9043	T-2742
Swayze	41O/15SE	Quinterra Resources	Au	Assess.	Str	1986		T-2649
				Assess.	GL,VLF,Mag,SP	1985	2.9050	T-2649
				Assess.	Assay Expnd.	1985-86	2.5201	T-2649
Thomas	41A/1NW	B.A. Resources	Au	Assess.	Mag	1986	2.9483	T-3083
Thorneloe	42A/6SW	Comstate Resources	Au	Assess.	Str	1985		T-2961
				Assess.	GL,GC	1985	2.8984	T-2961
		Esso Minerals	Au	Assess.	GL	1985	2.8795	T-2890
				Assess.	DD-1-170m	1985		T-2880
				Assess.	Mag	1983	2.9011	T-2880
		Falconbridge Ltd.	Au	Assess.	IP	1986	2.8990	T-3051
				Assess.	DD-3-871.3m	1986		T-3051
Tisdale	42A/11SW,6N	Davidson Tisdale Mn.	Au	Assess.	DD-1-230m	1985		T-3014
		Diepdaume Mines	Au	OMEP	U/G Wrk,Assays	1983	63.4291 OM83-5C-8	T-2498
		Kidd Creek Mines	Au	Assess.	HLEM,VLF,Mag	1985	2.8638	T-3008
		Pamour Porcupine	Au	Assess.	OVD-8-418.3m	1985	2.8509	T-1954
			Au	Assess.	Mag	1983	2.8160	T-2439
Tisdale, Whitney	42A/11SE	Bisnias-Meunier	Au	Assess.	VLF	1986	2.8865	T-2916
Tully	42A/14SE	Kidd Creek Mines	BM	Assess.	DD-1-191m	1986		T-3042

TABLE 6.5 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Turnbull	42A/5NE	455 Group Holdings	Au	Assess.	Str	1985		T-2612
				Assess.	GL	1985-86	2.9142	T-2613
	42A/12SE	Goldhurst Resources	Au	Assess.	Mag,VLF	1986	2.9148	T-3061
Hart	42A/11NW	Kidd Creek Mines	Au	Assess.	OVD-5-143.6m	1986	2.9219	T-3006
				Assess.	OVD-3-152.1m	1986	2.9218	T-3008
				Assess.	Mech	1986		T-3072
Whitesides	42A/5NE	Ivan J. Uba	Au	Nonassess.	GC Expnd.	1985	2.0995	T-3019
Whitney	42A/6NE,11	R.B. Allerston	--	Assess.	Mech,Man	1985		T-3018
		Kidd Creek Mines	Au	Assess.	Mag,VLF,EM	1985	2.8740	T-2313
		D. Meunier	Au	Assess.	GL	1985	2.8835	T-3026
		P. Meunier	Au	Assess.	VLF	1986	2.8985	T-2956
		Pamour Porcupine	Au	Assess.	DD-1-101.0m	1986		T-2818
		J.P. Sheridan	Au	Assess.	Mag,VLF	1986	2.9030	T-3048
Yeo	41O/9SE	B & B Mining Con.	Au	Assess.	GL	1985	2.8935	T-3044
				Assess.	Str,Str,Man,Mech	1985		T-3046
		Blue Falcon Mines	Au	Assess.	Mag,VLF,GL	1986	2.9421	T-3020
		Kidd Resources	Au	Assess.	Str	1985		T-2388

were just south of Highway 101 in an area mapped as sedimentary rocks (Ferguson 1957). Porphyry was intersected in many of the holes. These porphyries range from pyritic sericite schists to more massive quartz-feldspar bodies. A few holes intersected porphyries with red hematite alteration. Scattered gold intersections with core widths from less than a metre to over 3 m were obtained. These intersections were erratically distributed and no economically significant zone was discovered.

The company conducted induced polarization surveys, a trenching program, and drilled 25 diamond-drill holes on its Melrose Resources option. Pyritized and silicified zones in monzonite carrying low gold grades (2 to 3 g/t) were intersected over widths of up to 3.5 m (Dome Exploration (Canada) Limited, personal communication; personal observation; drill core, 1986).

COMINCO LIMITED

Cominco Limited carried out an ambitious program of gold exploration to the east and north of Timmins. An overburden drilling program consisting of six holes in lot 10, concession IV, German Township and 10 holes in Evelyn Township was completed in 1986.

Diamond drilling was done in lot 7, concession V (two holes, 496 m) and lot 1, concession III, five holes (887 m), Matheson Township.

In a joint venture with Ark La Tex Industries Limited, Cominco drilled two holes (350 m) in lot 4, concession III, Stock Township. Two holes (343 m) were drilled in lot 1, concession III and two holes (276 m) in lot 2, concession III, German Township, under this joint venture. A gold intersection of 0.36 ounce per ton (12.34 g/t) over a core length of 4.9 feet (1.5 m) was intersected by Cominco in the southern half of lot 2, concession III, German Township. This intersection occurred at a sedimentary/volcanic contact (Cominco Limited, personal communication, 1986).

PAMOUR INCORPORATED

In the latter part of 1986, Pamour Incorporated started an extensive program of gold exploration with $2.7 million of flow-through funding. Overburden and diamond drilling programs were started in Cody and and Macklem Townships. A 7000-foot (2134 m) diamond drill program also took place just north and west of the old Delnite Mine property on the Choy option in Deloro Township. In early 1986, Pamour completed some exploratory work in Matheson and Whitney Townships (Pamour Incorporated, personal communication, 1986).

ESSO MINERALS CANADA

Esso Minerals Canada diamond drilled one hole in Bond Township and ten holes in Stock Township along the Destor Porcupine Fault Zone. Some gold values were intersected with a few being worthy of follow-up drilling. In a joint venture with Robele Resource Development Limited, a total of eight holes (2000 m) were completed in the north-central parts of Denton and Thorneloe Townships. These were drilled on properties formerly held by Labrador Mining and Exploration Company Limited. Three holes were drilled into a felsic horizon containing interflow pyritic zones during a base-metal exploration program in Carscallen Township. Nothing of economic significance was intersected (Esso Minerals Canada, personal communication, 1986).

DAVIDSON TISDALE MINES LIMITED

Davidson Tisdale Mines Limited acquired a 100% interest, subject to a net profits royalty, in 18 Tisdale Township claims owned by Broulan Resources Incorporated adjacent to the Davidson Tisdale Mines Limied property. Geological and geochemical surveys were conducted in 1986 as well as 5295 m of diamond drilling. Seven quartz-sericite carbonate alteration zones containing gold values were located, including the western extension of the Davidson Tisdale main zone at depth. Here a 4.9-foot (1.5 m) intersection grading 0.25 ounce gold per ton (8.57 g/t) was obtained (Kenneth Guy, consulting geologist, personal communication, 1986).

ASARCO EXPLORATION COMPANY OF CANADA LIMITED

In 1986, ten overburden holes were drilled by Asarco in the southern part of Robb Township. Two follow-up diamond-drill holes were drilled to test anomalous gold values obtained in glacial till samples during the 1985 and 1986 overburden drilling programs. The source of these gold values was not found.

Asarco also completed six overburden drillholes on their claims in Hoyle Township in 1986 (Asarco Exploration Company of Canada Limited, personal communication, 1986).

LAC MINERALS LIMITED

As a continuation of their gold and base-metal exploratory program, which started in 1985, Lac Minerals Limited drilled 20 holes totaling 10 000 feet (3048 m) in Fallon and Langmuir Townships in 1986. Nothing of economic significance was found (Lac Minerals Limited, personal communication, 1986).

BELMORAL MINES LIMITED

Belmoral Mines Limited has entered into an option agreement with Broulan Resources Incorporated by which Belmoral will undertake exploration activities on Broulan ground in the Timmins area. A 5000-foot (1524 m) drill program was started in late 1986 by Belmoral in the northwestern corner of Whitney Township (Belmoral Mines Limited, personal communication, 1986).

CHEVRON CANADA RESOURCES LIMITED

Due to a corporate restructuring, Chevron Canada Resources Limited is becoming more committed to mining exploration. The company has changed its focus from strictly exploring for large mineral deposits to exploring for smaller economic ones as well.

Chevron drilled 185 "Wacker" overburden drillholes in the northeastern corner of Shaw Township. A follow-up trenching program was also done. Chevron flew an airborne survey over a volcanic-sedimentary contact on their property in the southern part of Fournier and Ottaway Townships (Chevron Canada Resources Limited, personal communication, 1986).

UTAH MINES LIMITED

Utah Mines Limited drilled a 1000-foot (305 m) hole east of Bristol Lake and north of Highway 101 in the central part of Bristol Township. The hole was collared in sedimentary rocks and entered highly siliceous and sericitic rock with fine fractures containing sulphide mineralization (pyrrhotite, pyrite, and minor molybdenite and chalcopyrite). A well developed quartz-feldspar porphyry, containing fine disseminated pyrite, was encountered further down the hole. No gold assays of economic significance were obtained (Utah Mines Limited, personal communication; personal observations, drill core, 1986).

ARGENTEX RESOURCE EXPLORATION CORPORATION/LENORA RESOURCES LIMITED JOINT VENTURE

The joint venture partnership of Argentex Resource Exploration Corporation and Lenora Resources Limited drilled six holes on a base metal showing previously discovered by trenching in Price Township (Argentex Resource Exploration Corporation, personal communication, 1986).

ZAHAVY MINES LIMITED

Zahavy Mines Limited diamond drilled seven holes (3000 feet, 1914 m) in 1986 on property optioned from Comstate Resources Limited in Mountjoy Township. Shear zones outlined by magnetic lows cutting across the property were the drill targets. Nothing of economic significance was intersected (Zahavy Mines Limited, personal communication; personal observations; drill core, 1986).

HILTON RESOURCE CORPORATION/LIVINGSTONE ENERGY CORPORATION JOINT VENTURE

Nine overburden drillholes were completed on the Hilton Resource Corporation/Livingstone Energy Corporation joint venture's claims in Macklem Township. Four out of the nine holes had anomalous gold values in the basal till (W. MacRae, consultant geologist, personal communication, 1986).

KANGELD RESOURCES LIMITED

In 1986, three diamond-drill holes were drilled off the ice on Fredrickhouse Lake in Dundonald Township, to explore the westerly extension of the Pipestone Fault. Due to the extremely thick overburden cover, only one hole hit bedrock. Another diamond drill program is planned for late 1986 or early 1987 (Don McKinnon, property vendor, personal communication, 1986).

UNITED KINGDOM ENERGY INCORPORATED

United Kingdom optioned 27 claims on and around the old Triple Lake Gold Mine in McArthur Township. Geophysical and geological surveys were conducted and the exposed vein at the minesite sampled. An overburden drill program is planned for early 1987 with a possible diamond drill program to follow (W. MacRae, consulting geologist, personal communication, 1986).

OTHER EXPLORATION PROGRAMS

Other exploration programs in the Timmins Resident Geologist's area include:

Golden Range Resources Incorporated—six diamond-drill holes (2122 feet, 647 m) in the north-central part Denton Township

Golden Trio Resources Limited —5000-foot (1524 m) diamond drill program on the Wetlaufer option, Turnbull Township

L.B.L. Rich Gold Mines Incorporated—three diamond-drill holes (1433 m), Deloro Township

Walker Exploration Limited—Sheraton Township

Lilianne Letourneau—Deloro Township

Highwood Resources Limited—Croxall option, Bristol and Thorneloe Townships

Hawk Resources Incorporated—Carscallen Township

Goldhurst Resources Incorporated—geophysical surveys, Turnbull Township

B.A. Resources Limited—Thomas Township

Asian Exploration/Development Limited—Robb and Jamieson Townships

SWAYZE BELT ECONOMIC GEOLOGIST PROGRAM by J.C. Ireland

INTRODUCTION

The Swayze Belt Economic Geologist Program entered into its second year in 1986. The program was designed to encourage and monitor exploration activities in the Swayze Greenstone Belt area and to evaluate and document new and known mineral occurrences for the purpose of publishing an Open File Report (currently being written). The program was initiated and is funded by the Mines and Minerals Division of the Ontario Ministry of Northern Development and Mines. J.C. Ireland is responsible for the program, working out of the Timmins Resident Geologist's Office.

During 1986, the Economic Geologist provided assistance and information to prospectors and mining industry personnel who were actively exploring or considering exploration in the Swayze area. The program of property evaluations continued with 30 visits made in the project area. Several tours were conducted for the benefit of prospectors, mining company representatives, representatives from the academic community, and the Ontario Government. During the course of the program, the Economic Geologist was able to obtain numerous reports, maps, and diamond drill core pertaining to several mineral occurrences and deposits on patented claims. This information was previously unavailable to the general public.

Much of this significant information was provided by companies and individuals currently owning or holding options on the various patented claim groups.

ECONOMIC GEOLOGY

Approximately 85 percent of the 3600 km^2 high mineral potential area in the Swayze is currently staked and in good standing. Most of the current exploration activity is for gold, and the focus of much of the attention is on the many known gold occurrences and small deposits scattered throughout the program area. A brief history of mineral exploration activities is summarized in Luhta *et al.* (1986, p.174). A more comprehensive history of exploration activities in the Swayze area is summarized in Gordon *et al.* (1979) and Thurston *et al.* (1977).

GENERAL GEOLOGY AND GOLD MINERALIZATION

The regional geology of the Swayze-Deloro Metasedimentary/Metavolcanic Belt and the surrounding granite-gneiss terrain of the Chapleau area is described by Thurston *et al.* (1977, p.11).

Geological descriptions of specific areas within the project area have been published over a long period of time (Parks 1900; Tanton 1916; Emmons and Thompson 1929; Bannerman 1933a, 1933b; Furse 1932; Rickaby 1935; Harding 1938; Meen 1944; Prest 1951; Moorhouse 1951; Laird 1936a, 1936b; Donovan 1965, 1968; Milne 1972; Goodwin 1965; Thurston *et al.* 1977; Breaks 1978; Innes 1977, 1978; Siragusa 1977, 1978, 1980a, 1980b, 1981, 1982, 1983; Cattell 1985; Love 1986).

Recent work by Siragusa (1978, 1980a, 1980b, 1981, 1982, 1983), Innes (1977, 1978) and others, plus additional work carried out by industry geologists, has provided much new information regarding the geology of the Swayze-Deloro Greenstone Belt. Diverse sequences of ultramafic, mafic, and intermediate volcanic rocks in the southern and northern portions of the Swayze Greenstone Belt not previously mapped were recognized. A close spatial association exists between ultramafic (komatiitic) volcanic sequences and many of the porphyry-associated gold occurrences and deposits in the Swayze area. This has led to significant new discoveries of gold mineralization. A detailed summary of recent advances in mineral exploration of the Swayze supracrustal rocks and a preliminary reclassification of the various gold mineralization types found in these rocks will be included in an Open File Report which is currently being written.

Over one hundred gold or gold-associated occurrences have been documented in the Swayze area. Recent work by both prospectors and mining companies has added newly discovered occurrences to the list and, with continued high levels of exploration activity in the area, the likelihood exists of additional discoveries being made.

PROPERTY EVALUATION AND DEVELOPMENT

A summary of the more advanced exploration and development programs in the Swayze area is given below.

Chesbar Resources Incorporated/Murgold Resources Incorporated

Chesbar Resources Incorporated has signed an agreement with Murgold Resources Incorporated in which Chesbar may earn up to 60 percent interest in 60 claims held by Murgold in Chester Township after three years. Early in 1986, a 12-hole, 1667 m (5470-foot) diamond drill program was carried out on the "20" Zone where limited previous work by Murgold had established a reserve of 9071 tonnes grading 10.3 g/t gold (10 000 tons at 0.3 ounce gold per ton). Eleven of the twelve holes completed encountered gold mineralization. Further drilling is planned on the "20" Zone to test the deposit at depth.

In October of this year, an exploration decline ramp was started on the No. 3 Gold Vein System located 3.2 km southwest of the "20" Zone. The ramp is being driven for a planned length of 490 m (1600 feet) parallel to the No. 3 Vein System previously outlined by Murgold Resources. The ramp portal was collared in the hanging wall and driven through the No. 3 and No. 4 veins at a vertical depth of 15.3 m (50 feet) before being turned parallel to the vein system. The two main veins are 13 m (43 feet) apart at this point and sampling returned 9.8 g/t gold across 1.98 m (0.285 ounce gold per ton over 6.5 feet) and 34.83 g/t across 2.9 m (1.016 ounce gold per ton over 9.5 feet) from the western wall of the drive. Samples from the eastern wall assayed 53.14 g/t gold across 0.9 m (1.55 ounce gold per ton over 3.0 feet) and 8.5 g/t gold across 1.2 m (0.247 ounce gold per ton over 4.0 feet) as well as a third section which ran 4.0 g/t gold across 2.0 m (0.117 ounce gold per ton over 6.5 feet).

The ramp had been driven for a length of approximately 180 m (600 feet) by the end of 1986 and drill stations were being cut as the ramp advanced. When complete, a crosscut will be driven to the No. 3 and No. 4 veins at a vertical depth of 61 m (200 feet). Ground geophysical surveys, completed earlier this year, have defined the No. 3 Vein System over a strike length in excess of 1200 m (4000 feet) and previous diamond drilling by Murgold indicated a width in excess of 120 m (400 feet).

Besides the No. 3 and No. 4 veins, the No. 3 Vein System hosts the No. 5 and No. 2 veins, located in the footwall and hanging wall respectively. These veins will be the target of evaluation by underground diamond drilling. Several other vein systems and gold-bearing zones located on the property are to be drill tested in the future. Murgold Resources plans to carry out additional exploration programs on the surrounding 231 claims not included in the Chesbar/Murgold agreement (Chesbar Resources Incorporated, personal communication, 1986; Murgold Resources Incorporated, personal communication, 1986; The Northern Miner Press, September 15, October 27, 1986)

Emerald Isle Resources Incorporated

Emerald Isle Resources Incorporated is currently carrying out an extensive exploration and development program on its Kenty Gold Property in northeastern Swayze Township. The property consists of 16 contiguous patented claims on which the first recorded gold discovery in the Swayze-Deloro Greenstone Belt was made in 1930. At that time two separate 150 m (500-foot) deep vertical shafts were put down 550 m (1800 feet) apart, and several thousand feet of underground development was completed to evaluate some of the more than 20 veins discovered on the property. Since 1935, the property has received only sporadic attention.

In August of this year, Emerald Isle Resources began an extensive stripping and trenching program on the northeast-trending main vein zone, an area that extends for more than 900 m from the No. 1 (South) Shaft to northeast of the No. 2 (North) Shaft. The actual width of the main vein zone is not known, but within it, narrow, 0.5 to 4.5 m wide (1.6 to 15.0 feet wide) individual gold-bearing quartz-carbonate veins and auriferous quartz-carbonate stockworks and ladder vein systems have been exposed across widths of 150 m (500 feet).

Recent step-out trenching has exposed newly discovered auriferous quartz-carbonate veins up to 11 m wide located approximately 460 m southeast of the known trend of the Main Vein Zone. A large number of auriferous quartz vein systems exposed over a length of more than 900 m occur within a favourable horizon over 610 m wide on the property. To test this potential, Emerald Isle Resources removed much of the overburden between the two shafts and collected 156 bulk samples averaging 907 kg (2000 pounds) from the numerous exposed veins. Each bulk sample was crushed to -0.65 cm (-1/4 inch) and between 7 and 10 samples from each were sent for assay. Results of the bulk sampling program are incomplete at the time of writing (December 11, 1986).

At the end of 1986, there were two diamond drills working on the property and 12 holes had been completed totaling approximately 1220 m (4000 feet). Drilling is scheduled to continue until February, 1987. Results reported by Emerald Isle Resources from three holes completed on a new vein discovery on patented claim S.20715 returned an average of 3.1 g/t gold across 11 m (0.09 ounce gold per ton across 36 feet). High grade values over 1.0 to 1.2 m (3- to 4-foot) widths occur within the vein zone. On the No. 3 Vein, located north of the No. 2 (North) Shaft, assays of 8.3 g/t gold across 5.2 m (0.24 ounce gold per ton across 17 feet) were reported.

It was recently determined that the No. 3 Vein actually consists of five narrow, closely spaced quartz veins within an envelope of carbonatized and pyritic "altered rock". The 1986 drilling was directed at testing the Main Vein Zone at depth (Emerald Isle Resources Incorporated, personal communication, 1986; The Northern Miner Press, June 16, September 29, 1986).

Novamin Resources Incorporated

In 1985, Novamin Incorporated acquired all the assets of Sulpetro Minerals Limited, which included 47.5 percent interest in the Rundle Gold Properties (Labrador Mining and Exploration Company Limited, 47.5 percent) located in Newton Township. With Labrador Mining (formerly Hollinger Gold Mines Limited) selling all of its mining interests, Novamin negotiated for and acquired 95 percent ownership in the properties. A private interest holds 5 percent interest carried from a previous agreement with Hollinger Gold Mines Limited, (circa 1954).

Hollinger's work from 1934 to 1942, which included diamond drilling and underground development, plus Sulpetro's 1983 diamond drilling program, established a reserve of 156 035.64 tonnes grading 8.9 g/t gold (172 000 tons at 0.258 ounce gold per ton) in the "B" Zone above the 91 m (300-foot) level.

More than 7500 m (24 600 feet) of diamond drilling in 24 holes were completed in 1986 and plans are to continue drilling until the end of February, 1987. A total of 14 000 m (46 000 feet) of drilling is planned. Extensive stripping was completed on the Southeast Vein Cluster, a small network of gold mineralized fractures located approximately 150 m (500 feet) southeast of the "B" Zone. Detailed mapping and sampling was started in late 1986 on this area.

Recent drilling has indicated the presence of four gold mineralized zones at the northern contact of a northwest-trending feldspar porphyry body intruded into mafic to ultramafic volcanic rocks. The gold zones occur as pipe-like pyrite-rich shoots and stockworks within a hybrid contact zone of carbonatized and hematized porphyry and volcanic rocks. The altered contact has been outlined for 520 m (1700 feet) and is open in both directions. The "B" zone, where most of the published reserves have been outlined, is 40 to 80 m (130 to 260 feet) long and varies in thickness from 2 to 19 m (6.5 to 62 feet). It has been extended to a vertical depth of 375 m (1230 feet) and is still open. The "A", "A South", and "C" zones have not been fully evaluated. Preliminary drill results indicate that the "A" and "A South" zones combine at depth. The "A-A South" zone has been drill tested to a vertical depth of 260 m (853 feet) (Novamin Resources Incorporated, personal communication, 1986; The Northern Miner Press, October 20, 1986; George Cross Newsletter, October 6, 1986).

EXPLORATION ACTIVITIES

Most of the current and recent activities were directed toward the exploration for possible extensions of known gold occurrences in the Swayze area. New discoveries of gold mineralization in the central and northern parts of the Swayze area has resulted in increased ground acquisition and exploration activity during the latter part of the year. An upswing in exploration activities is expected in 1987. A brief description of most of the exploration activities carried out in 1986 is given below.

Blue Falcon Mines Limited completed geological mapping and ground geophysical surveys over eight unpatented claims located in Yeo Township. Total line kilometres per survey was 15.2 km. The property is situated at the western end of a large multiphase granitic batholith that extends eastward for several kilometres and is host to numerous gold-bearing occurrences. Mafic volcanic rocks are exposed on the northern and southern boundaries of the claim group. Of the twelve VLF electromagnetic-defined conductors located during the survey, at least four are believed to be formational in nature. Several other responses are believed to be structurally related based upon geological interpretation (Blue Falcon Mines Limited, personal communication, 1986; Assessment Files, Resident Geologist Office, Timmins).

During the period December, 1985, to January, 1986, Canadian Nickel Company Limited (Canico)/Quinterra Resources Incorporated joint venture completed an 82-hole reverse circulation drilling program totaling 1065.97 m (3497.28 feet) on a portion of the 270 claim contiguous group located in Tooms and Greenlaw Townships. The purpose of the survey was to test the gold potential of the major portion of the property with emphasis on testing two known green carbonate-silica alteration zones discovered by Quinterra Resources in 1981. The overburden drill program was chosen due to the presence of an extensive sheet of glaciolacustrine sands and subglacial basal tills overlying much of the property. A major esker system bisects the central portion of the property. The survey determined that much of the area is underlain by mafic volcanic flows with interbedded wackes and ultramafic rocks that are locally carbonatized or serpentinized. The highest bedrock value was 445 ppb gold from a green carbonate rock with quartz veining and disseminated pyrite. Gold grains in till were observed in 25 holes drilled and it was concluded that the geological setting is favourable for gold deposits to occur. Canico and Quinterra have since terminated the joint venture agreement and the ground is currently held by Quinterra Resources Incorporated (Canadian Nickel Company Limited, personal communication, 1986; Assessment Files, Resident Geologist Office, Timmins).

During January and February, 1986, Canadian Gold Resources Incorporated diamond drilled six holes totaling 637.8 m (2092.5 feet) to test geophysical targets defined late in 1985. Their property consists of 48 unpatented mining claims covering the Pensyl Lake showing in Groves Township. Although silica and carbonate alteration was noted in the core, no economic gold values were reported. Canadian Gold Resources has earned a 60 percent interest in all of Kidd Resources Incorporated properties through the expenditure of $500 000. In Chester Township, three diamond-drill holes totaling 457 m (1500 feet) were completed on the Kidd No. 1 zone in an effort to confirm the depth extension and along strike continuity of the vein system. From this drilling, Canadian Gold Resources recently reported a 6.7 m (22-foot) intersection at a vertical depth of 180 m (600 feet) grading 16.8 g/t gold (0.49 ounce gold per ton). On the Kidd No. 2 Zone, which is the westward continuation of the Chesbar/Murgold No. 20 Zone (*see* Chesbar Resources Incorporated in "Developments"), Canadian Gold Resources is planning to take a 18 143.7 tonne (20 000 ton) bulk sample, estimated to average 8.2 g/t gold (0.24 ounce gold per ton), for mill testing. The material may be trucked to Timmins for milling at the Diepdaume Mill (Canadian Gold Resources Incorporated, personal communication, 1986).

Dome Exploration (Canada) Limited has more than fulfilled the requirements of a four-year option agreement with Algoma-Talisman Minerals Limited. This gave Dome Exploration sole right to explore approximately 260 km^2 of patented land covering the Townships of Dale, Newton, and Coppell, located in the central part of the Swayze-Deloro Greenstone Belt. Between December, 1985, and April, 1986, Dome Exploration carried out linecutting, ground geophysical surveys, and diamond drilled 28 holes totaling 4070 m (13 350 feet) in Newton township. Total expenditures over the four-year period came to approximately 2.5 million dollars. Dome Exploration earned the right to an 80 percent interest in the mineral rights to 64.75 km^2 of ground of their choosing within the three townships. In May, 1986, Dome Exploration selected a continuous block within Newton Township that included most of the ground that Dome Exploration had worked during 1984 and 1985. Algoma-Talisman has retained the other 20 percent interest in the land parcel selected by Dome Explora-

TABLE 6.6 **EXPLORATION ACTIVITY DURING THE YEAR.**

Number on Figure	Individual or Company		Activity
1.	Agassiz Resources Ltd.	Fallon, Fasken	Magnetic and very low frequency electromagnetic surveys
2.	Algoma-Talisman	Silk, Horwood	Airborne geophysical surveys
3.	R.E. Allerston	Bristol	Magnetic and electromagnetic surveys
		Stock	Magnetic and horizontal loop electromagnetic surveys
4.	Anyox Metals Inc.	Sewell	Diamond drilling
5.	Arctic Red Resources	Leeson	Airborne magnetic and very low frequency electromagnetic surveys
6.	Argentex Res./Lenora Explns.	Fripp, Price	Diamond drilling
7.	Ark La Tex/Cominco J.V.	Stock, German	Diamond drilling
8.	Armistice Resources	Brackin	Geochemical assays
9.	Asarco Expln.	Fox,Pyne,Brower,Hoyle, Fallon,Cote	Overburden drilling
		German	Magnetic and electromagnetic surveys
		Robb	Overburden and diamond drilling
10.	Aslan Exploration/Development	Robb, Jamieson	
11.	Aurelian Developers	Brackin	Geochemical survey
12.	B. A. Resources	Thomas	Magnetic survey
13.	D.O. Baker	Neill	Airborne magnetic and electromagnetic surveys
14.	Belmoral Mines/Broulan Resources	Whitney	Diamond drilling
15.	D. Bienias	Tisdale	Very low frequency electromagnetic survey
16.	Calvin Black	Huffman	Geochemical survey
17.	Blue Falcon Mines Ltd.	Yeo	Linecutting, geochemical, magnetic and electromagnetic surveys
18.	Bryndon Ventures Inc.	Yeo	Geological survey
19.	Canadian Gold Resources	Groves	Geophysical surveys, diamond drilling
		Chester	Diamond drilling
20.	Canadian Nickel Co.	Greenlaw,Tooms,Malcrow	Overburden drilling, geophysical surveys
21.	Canamax Resources	Hoyle, Stock, German	Diamond drilling
22.	Canreos Minerals (1980) Ltd.	Brackin	Diamond drilling
23.	Carleon Mines/Kenty Optimists	Rollo, Raney	Airborne magnetic and very low frequency electromagnetic surveys
24.	Chesbar Resources/Murgold	Chester	Diamond drilling
25.	Chevron Minerals Ltd.	Shaw, Whitney	Overburden drilling, trenching
		Ottaway, Fournier	Airborne magnetic and electromagnetic surveys
26.	Cominco	Bristol	Magnetic and very low frequency electromagnetic surveys, diamond drilling
		German, Evelyn	Overburden drilling
		Matheson	Diamond drilling
		Stock	Magnetic and electromagnetic surveys, diamond drilling

TABLE 6.6 **Continued**

Number on Figure	Individual or Company		Activity
27.	Comstate Resources	Mountjoy	Core assaying, overburden drilling
28.	Consolidated Montclerg	Clergue	Diamond drilling
29.	Davidson Tisdale	Tisdale	Diamond drilling, geological and geochemical surveys
30.	Dome Exploration	Bristol	Diamond drilling
		Fallon, Fasken	Diamond drilling
		Langmuir, Blackstock	Induced polarization and magnetic survey, soil sampling, diamond drilling, trenching
31.	Dome Expln./Algoma-Talisman	Newton	Linecutting, diamond drilling, geological and geophysical surveys
32.	Emerald Isle	Chester	Prospecting, sampling
		Swayze	Stripping, trenching, diamond drilling, soil geochemical survey
33.	Esso Minerals	Bond,Stock,Carscallen	Diamond drilling
34.	Esso Minerals/Nobele Resources	Denton, Thorneloe	Diamond drilling
35.	Falconbridge Ltd.	Carscallen, Godfrey, Kidd, Macdiarmid, Hoyle	Diamond drilling
		Cody	Geological, magnetic and very low frequency electromagnetic surveys, diamond drilling
36.	Falconbridge/Comstate	Deloro	Diamond drilling
		Thorneloe	Diamond drilling and induced polarization surveys
37.	Falconbridge/Hanson Minerals	Tully	Diamond drilling
38.	Falconbridge/Mariner Expln.	Lucas	Diamond drilling
39.	Falconbridge/United Kingdom	Macklem	Diamond drilling
40.	Falconbridge/Umex	Matheson	Diamond drilling
41.	Philip L. Frankow	Moggy, Neill	Magnetic, electromagnetic, very low frequency electromagnetic and resistivity surveys
42.	Roman Gadzala	Douglas	Magnetic and very low frequency electromagnetic surveys
43.	Gail Resources	Keith	Stripping, sampling
		Shaw	Diamond drilling
44.	Elmond Gauthier	Hillary	Manual labour
45.	Glen Auden	Denyes	Reconnaissance mapping and sampling
		Kenogaming	Diamond drilling
46.	Golden Range Resources	Denton	Diamond drilling
47.	Golden Trio Resources	Turnbull	Diamond drilling
48.	Goldhurst Resources Ltd.	Turnbull	Magnetic, very low frequency electromagnetic, and horizontal loop electromagnetic surveys

TABLE 6.6 Continued

Number on Figure	Individual or Company		Activity
49.	Goldrock Resources Ltd.	Raney	Magnetic, very low frequency electromagnetic and induced polarization surveys
		Sewell, Reeves	Linecutting, geological, magnetic and very low frequency electromagnetic surveys
50.	J.F. Gravely and C.H. Mortimer	Silk, Norwood	Airborne magnetic and very low frequency electromagnetic surveys
51.	Harger Resources	Osway	Diamond drilling
52.	Hawk Resources	Carscallen	Overburden drilling, geological and horizontal loop electromagnetic surveys
53.	Highwood Resources	Bristol, Thorneloe	
54.	Hilton Resources Corp.	Macklem	Overburden drilling
55.	D.G. Innes	Garnet	Geological survey, diamond drilling and assays
56.	Johns-Manville Canada Ltd.	Reeves, Penhorwood	Linecutting
57.	Kangeld Resources	German, Dundonald	Geophysical surveys and diamond drilling
58.	W.O. Karvinen & Associates	Penhorwood	Magnetic, very low frequency and horizontal loop electromagnetic and induced polarization surveys
59.	Kidd Creek Mines	Godfrey	Magnetic, electromagnetic and very low frequency EM surveys
		Jamieson	Magnetic survey
		Lucas	Airborne geophysical, ground magnetic and electromagnetic surveys, overburden and diamond drilling
		Macdiarmid, Mark	Overburden drilling
		Macklem	Magnetic and electromagnetic surveys
		Reid	Geological, magnetic, very low frequency and horizontal loop electromagnetic surveys
60.	King-Errington Resources Ltd.	Chester	Diamond drilling
61.	Lac Minerals	Fallon, Langmuir	Diamond drilling
		Sheraton	Magnetic survey
62.	J. Landers/R. Wdowczyk	Norwood	Trenching, sampling
63.	R. Lavoie and Y. Collins	McArthur	Very low frequency electromagnetic survey
64.	L.R.L. Rich Gold Mines	Deloro	Diamond drilling
65.	Lilianne Letourneau	Deloro	
66.	Magenta Development Corp.	Pharand	Magnetic and electromagnetic surveys
67.	Manville Canada	Penhorwood	Electromagnetic and radiometric surveys
68.	S.L. Masson	Dublin	Geological survey
69.	D. McKinnon	Calvert, Clergue, Little, McCart	Airborne magnetic and very low frequency electromagnetic surveys
		Dundonald	Airborne magnetic and very low frequency electromagnetic surveys, ground magnetic and electromagnetic surveys
		German	Geological survey

TABLE 6.6 Continued

Number on Figure	Individual or Company		Activity
70.	Melrose Resources	Blackstock	Diamond drilling
71.	D. Meunier	Fallon	Basal till sampling
		Geary	Geological survey
72.	P. Meunier	Whitney	Very low frequency electromagnetic survey
73.	J.A. Mortson	Deloro	Magnetic and very low frequency electromagnetic surveys
74.	R. Murphy	Fripp	Magnetic and electromagnetic surveys
75.	New Texmont	Sewell	Diamond drilling
76.	Noranda Exploration	Bond, Deloro	Diamond drilling
		Dore,Garnet,Hillary, Penhorwood,Reeves,Sewell	Geological and geochemical surveys
		Keefer	Geological, geochemical, magnetic and electromagnetic surveys
		Mallard	Linecutting, sampling, geological and geochemical surveys
		Moen, Moggy	Geological surveys
		Mountjoy	Geological survey, overburden and diamond drilling
		Ogden	Overburden and diamond drilling, magnetic and electromagnetic surveys
77.	Noranda Expln./Comstate	Deloro, Thorneloe	Diamond drilling
78.	Noranda Expln./Go-West Amal. J.V.	Bond	Diamond drilling
79.	Novamin Inc.	Newton	Diamond drilling, stripping
80.	Irene Owen	Horwood	Geological and very low frequency electromagnetic surveys, trenching
81.	Pamour Inc.	Deloro	Stripping, diamond drilling
		Macklem, Cody	Magnetic and very low frequency electromagnetic surveys, overburden and diamond drilling
		Matheson	Magnetic survey, overburden and diamond drilling
		Whitney	Exploration
82.	J.P. Patrie	Penhorwood	Linecutting, magnetic and electromagnetic surveys
83.	Porcupine Balmoral Resources	Adams	Magnetic and very low frequency electromagnetic surveys
84.	Millie Puddester	Whitney	Electromagnetic survey
85.	Quinterra	Garnet	Diamond drilling
		Halcrow,Tooms,Greenlaw	Overburden drilling, geophysical survey
		Swayze	Assays, diamond drilling
86.	Regal Petroleum	Halcrow,Greenlaw,Tooms	Induced polarization survey, trenching and diamond drilling
87.	J. Robert	Mann	Airborne magnetic and very low frequency electromagnetic surveys
88.	Arvo Salo	Clergue	Airborne magnetic and very low frequency electromagnetic surveys, ground magnetic survey

TABLE 6.8 Continued

Number on Figure	Individual or Company	Activity	
89.	Arvo Salo, L. Salo, R. Salo, D. Bedard	Evelyn, German, Hoyle, Little, McCart, Mark, Newmarket	Airborne magnetic and very low frequency electromagnetic surveys
90.	G. Sanford	Keith	Trenching, sampling
91.	J.P. Sheridan	Deloro	Electromagnetic survey and assays
		German	Electromagnetic survey
		Whitney	Magnetic and electromagnetic surveys
92.	M.P. Shunock	Leeson	Sampling and geological survey
93.	Gordon Smith	Huffman	Geochemical analyses
94.	R.G. Smith	German	Plugger sampling
95.	St. Andrew Goldfields/Esso Minerals	Stock	Diamond drilling, induced polarization survey
96.	Stellar Resources	Robb	Magnetic and horizontal loop electromagnetic and induced polarization surveys
97.	Unigold Resources Ltd./Bobele Res.	Keith, Muskego, Reeves, Penhorwood	Linecutting, induced polariztion, geological and magnetic surveys
98.	United Kingdom Energy	McArthur	Linecutting, magnetic, very low frequency electromagnetic and geological surveys
99.	Utah Mines	Bristol	Diamond drilling
		Muskego, Keith	Diamond drilling, induced polarization survey
		Penhorwood	Geological, geophysical, geochemical and induced polarization surveys, stripping and sampling
100.	Victoria Porcupine Resources Inc.	Ogden	Diamond drilling
101.	Wabigoon Resources	Whitney	Diamond drilling
102.	Walker Exploration	Sheraton	
103.	Weaco Resources	Benton	Geological survey
		Mallard	Airborne magnetic and electromagnetic surveys
104.	Zahavy Mines/Comstate	Mountjoy	Diamond drilling
105.	652422 Ontario Inc. (C. Mortimer)	Silk	Airborne magnetic and very low frequency electromagnetic surveys
106.	655 Group Holdings	Turnbull	Beneficiation Study

tion. All other ground in the three townships reverts back to Algoma-Talisman Minerals Limited. Algoma Talisman is currently in the process of evaluating proposals from other interests.

Dome Exploration crews were active on the property for most of 1986, carrying out a perimeter survey of the selected area, linecutting, geological mapping, completing ground geophysical surveys, and prospecting. Much effort was directed toward locating the source of large, gold mineralized float discovered in several locations on the property (Dome Exploration (Canada) Limited, personal communication, 1986; Algoma-Talisman Minerals Limited, personal communication, 1986; The Northern Miner Press, January 6, 1986).

Gall Resources Incorporated carried out extensive prospecting and limited stripping and sampling on their claims in Keith Township. Gall Resources currently controls ground surrounding the Joburke Mine, a former gold producer in Keith Township. They also have the ground on which two known gold occurrences occur; the Hoodoo showing and a poorly exposed vein system which was first documented by Prest (1951). The property is currently idle pending the completion of financing (Gall Resources Incorporated, personal communication, 1986).

Glen Auden Resources Limited completed a four-hole diamond drill program totaling 620 m (2032 feet) on the Golden Range Resources Incorporated property in Kenogaming Township. The property was optioned to Glen Auden Resources in 1984. The purpose of the drill program was to test geochemically anomalous gold values associated with a highly sheared sequence of quartz-sericite-pyrite schists and felsic tuffs. Drill targets were chargeability highs defined by an induced polarization survey. The property consists of 43 unpatented claims covering the northwestern extension of a major shear zone that hosts the Dunvegan and Jonsmith Gold-Zinc Occurrences, located approximately 800 m to the east. Drilling intersected variably sheared felsic tuffs and sericitic schists commonly mineralized with 1 to 5 percent finely disseminated pyrite and traces of molybdenite and chalcopyrite. Fluorite occurs in hairline fractures. The best value was 600 ppb gold over a 0.9 m (3.0-foot) section near the bottom of hole G.A.K.-4 which was collared farthest to the northwest. At the end of 1986, Glen Auden Resources was evaluating the results of the initial drilling program (Glen Auden Resources Limited, personal communication, 1986; Assessment Files, Resident Geologist's Office, Timmins).

Glen Auden Resources has 100 percent interest in two properties in Denyes Township and one property in Swayze Township totaling 77 unpatented claims. In Denyes Township, Glen Auden Resources holds six claims covering the old Sylvanite Gold Mines Limited occurrence and 39 claims located in the northeastern part of the township called the Topboot Lake claim group, on which the old Derraugh Occurrence is situated. Both showings are documented by Donovan (1968). Glen Auden Resources carried out reconnaissance mapping on these two properties and sampled the old showings. Work on the Topboot claims revealed a carbonatized volcanic unit hosting quartz veins which returned values from grab samples of between 6.0 and 21.15 g/t gold (0.176 and 0.617 ounce gold per ton). The average of ten grab samples of quartz vein material and mineralized tuff from this area was 12.9 g/t gold (0.378 ounce gold per ton). One mineralized tuff sample returned 44.57 g/t gold (1.3 ounce gold per ton). The vein zone is reported to be up to 3.8 m (12.5 feet) wide in places and is open at both ends of the 60 m (200-foot) long exposed portion of the vein. The gold assay values are consistent with values reported by Rickaby (1935, p.27-29). In Swayze Township, Glen Auden Resources holds 32 claims straddling the contact between felsic flows, pyroclastic rocks and porphyries, and mafic to ultramafic flows.

A number of airborne electromagnetic anomalies have been detected at the contact zone in the central portion of the property (Ontario Geological Survey, 1982.) Glen Auden Resources also announced a joint venture agreement with J-Dex Mining and Exploration Limited relating to a 73 unpatented claim property in Raney Township. Glen Auden Resources Limited and Goldrock Resources Incorporated can each earn a 25 percent interest in the property by incurring $250 000 in exploration expenditures on the property over a four-year period. Glen Auden completed an induced polarization survey to trace the known gold-bearing zones beneath extensive overburden (Glen Auden Resources Limited, personal communication, 1986; The Northern Miner Press, September 1, 1986, December 8, 1986; Assessment Files, Resident Geologist's Office, Timmins).

Hargor Resources Incorporated diamond drilled two holes totaling 230.4 m (756 feet) on a 12 unpatented claim group in Osway Township. The property is located 4 km southwest of the Jerome Mine site. The drillholes intersected a transitional sequence of mafic to felsic fragmentals, tuffs, and andesitic flows sparsely mineralized with pyrite. Narrow feldspar porphyry dikes were encountered near the bottom of one hole. No assay results are available (Hargor Resources Incorporated, personal communication, 1986; Assessment Files, Resident Geologist Office, Timmins).

Carlson Mines Limited and the Kenty Optimists Syndicate combined their efforts to initiate a 697 line kilometre (433 line mile) airborne magnetic and VLF-electromagnetic survey covering 360 claims in Rollo and Raney Townships. Carlson Mines Limited holds 174 unpatented claims in Rollo and Raney Townships. Kenty Optimists Syndicate holds 184 claims divided between Rollo Resources Prospecting Syndicate (71 claims), Rollover Resources Prospecting Syndicate (40 claims), Hanson Lake Prospecting Syndicate (30 claims), and Kenty Resources Limited (43 claims) (Kenty Optimists Syndicate, personal communication, 1986; Assessment Files, Resident Geologist Office, Timmins).

King Errington Resources Limited completed an 11-hole diamond drill program totaling 760 m (2500 feet) on six patented claims covering the former Lawrence Copper-Gold Occurrence in Chester Township. The purpose of the drill program was to test at depth a mineralized zone exposed for over 200 feet on surface. King Errington reported surface channel sample results as high as 17.0 percent copper and 15.4 g/t gold (0.45 ounce gold per ton) across 2.1 m (7.0-foot) widths.

King Errington is starting a small bulk sampling program on the showing. They plan to take 1.81 tonnes (2 tons) for metallurgical testing (King Errington Resources Limited, personal communication, 1986).

The J. Landers/R. Wdowczyk property consists of 17 unpatented claims in Horwood Township tied onto the northern boundary of the Orofino Resources Limited property. During 1986, trenching, sampling, and limited shallow diamond drilling was completed on to mineralized zones. Mineralization occurs as coarse pyrite accumulations in quartz veins and within altered pillowed mafic volcanics where pillow rims are largely replaced by semi-massive to massive seams of pyrite. Gold grades are anomalous erratic. Messrs. Landers and Wdowczyk are trying to determine if gold grades will improve with depth (J. Landers and R. Wdowczyk, personal communications, 1986; personal observations; Assessment Files, Resident Geologist Office, Timmins, 1986).

Muscocho Explorations Limited diamond drilled five holes totaling 610 m (2000 feet) on portions of a 66 unpatented claim group under option from Jerome Gold Mines Limited. The holes were drilled to test a gold showing and geophysically defined targets. Drill results indicate the presence of "mineralized zones" but gold values were low. Muscocho regards the claims as an early stage prospect (Muscocho Explorations Limited, personal communication, 1986).

New Texmont Explorations Limited completed a five-hole, 777.5 m (2500-foot) diamond drill program on the 12 unpatented claim R.U. Tremblay Property, located in southwestern Sewell Township. The holes were drilled to test the old Card Lake Copper Limited showing which consists of a series of gold mineralized quartz stringers exposed by stripping in 1984. Results of the current drilling failed to reproduce values obtained from surface sampling or from results of drilling completed by Card Lake Copper Limited in 1974 (Assessment Files, Resident Geologist Office, Timmins).

Noranda Exploration Company Limited has an option agreement with Adeline-International Mines Incorporated on a block of 13 patented and 51 unpatented claims in central Mallard Township. During 1986, Noranda re-established approximately 50 km of grid line and carried out detailed geological mapping and geochemical sampling on the property. Noranda also completed stripping, trenching, and sampling on the patented claims covering the old Ferland-Gauldie-Mogridge gold showings, first discovered in 1933. Further work is planned on the property (Noranda Exploration Company Limited, personal communication, 1986).

J. Patrie holds a group of 41 unpatented claims in central Penhorwood Township. The property is underlain by a sequence of extensively carbonatized and locally sheared mafic and ultramafic flows and associated metasediments intruded by a large sericitic, carbonatized feldspar porphyry stock. Sampling of the porphyry indicates low but anomalous gold values throughout. Linecutting and ground geophysical surveys have been completed and an induced polarization survey is planned to evaluate potentially mineralized zones outlined by the previous surveys (J. Patrie, personal communication, 1986).

Regal Petroleum Limited began a major exploration program on their large group of claims in Halcrow Township. Focus of the current program is the Main Zone of the Halcrow-Swayze Gold Mine and a second, recently discovered mineralized zone located about 120 m north of the Main Zone shaft area. The ongoing program involves diamond drilling approximately 2500 m (8200 feet) in 12 to 14 holes to test targets defined by induced polarization surveys carried out in 1985 and 1986. Regal also plans to drill beneath diamond-drill holes completed in 1985 which encountered ore grade gold intersections over narrow widths within the main zone. In addition, step-out holes are planned to test the southeastern extension of the main zone and the recently defined zone to the north. At the time of writing (December 11, 1986), nine drillholes totaling approximately 1800 m (6000 feet) have been completed (Orequest Consultants Limited, personal communication, 1986; George Cross Newsletter, June 20, 1986).

Unigold Resources Limited has optioned 99 unpatented claims in Muskego and Reeves Townships. Unigold Resources completed ground geophysical surveys over parts of the claim group and carried out a program of pitting, stripping, trenching, and sampling on several geophysically-defined targets on the property. Extensive overburden prevented the testing of several induced polarization chargeability anomalies believed to represent the eastward continuation of a wide carbonate-sericite alteration zone, mineralized with pyrite and arsenopyrite, which was discovered by Utah Mines Limited earlier this year (*see* Utah Mines Limited in "Exploration Activities"). Unigold has spent approximately $100 000 on the property to date. A ten-hole, 1200 m (4000-foot) diamond drill program is scheduled for 1987 (Unigold Resources Limited, personal communication, 1986).

Utah Mines Limited has options on two properties in Penhorwood Township and holds 100 percent interest in a third property situated in Muskego and Keith Townships.

Utah Mines Limited holds 100 percent interest in a continuous block of 67 unpatented claims in Muskego Township (49 claims) and Keith Township (18 claims). Utah Mines completed a 12-hole, 1767 m (5800-foot) diamond drill program to test ground geophysical and geochemical anomalies outlined in 1985. Assay results from many of the holes were disappointing. Two holes, drilled to test a southwest-trending induced polarization chargeability anomaly, encountered a highly sheared, siliceous carbonate-sericite zone containing pyrite and arsenopyrite mineralization over widths up to 20 m (65 feet). The entire width of the mineralized zone showed anomalous gold in the 400 to 1400 ppb range. The second hole had a 1.8 m section assaying 6.9 g/t gold (0.2 ounce gold per ton over 6.0 feet) within a silicified section of the carbonate-sericite-arsenopyrite zone. Utah Mines diamond drilled an additional five holes on the same zone, confirming the continuity of the mineralized horizon 490 m (1600 feet) to the southwest of the discovery holes. The zone is still open along strike and at depth. Recently completed induced polarization surveys have traced the horizon across the entire property, inferring a strike length in excess of 5 km.

Utah Mines Limited optioned four patented claims in central Penhorwood Township referred to as the Bragagnola (Bromley) Property (*see* Milne 1972, p.66). There are several documented gold-silver and lead-zinc-gold-silver occurrences on the property. Utah Mines completed ground geophysical surveys, geological mapping, and a multielement geochemical sampling program on the four-claim group. Survey results indicate the presence of a highly sheared zone over 800 m (2640 feet) long and up to 120 m (400 feet) wide occurring within a sequence of massive to pillowed mafic and ultramafic volcanic rocks. Coincident geophysical and geochemical anomalies occur within the shear zone. Stripping on a previously known showing within this zone of carbonate fuchsite-bearing schist revealed a 10 m (32-foot) wide quartz stockwork bounded by two subparallel graphitic shears. Isolated pods and lenses of massive sphalerite and galena occur within the stockwork. Sampling returned high grade silver, zinc, and lead values locally and high-grade but erratic gold values have been obtained from the graphitic shears at the limits of the stockwork. Other showings on the property have not yet been evaluated.

Utah Mines Limited holds an option on 17 unpatented claims located in east-central Penhorwood Township. During 1986, Utah completed several ground geophysical surveys, a geochemical survey, a geological mapping program, and extensive stripping, trenching, and sampling on a zone of highly carbonatized mafic to ultramafic pillowed flows intruded by several felsic porphyry dikes and small stocks.

Numerous quartz veins and quartz stockworks have been exposed. Targets have been defined for a future diamond drill program (Utah Mines Limited, personal communication, 1986).

Weaco Resources Limited completed a three-hole, 457 m (1500-foot) diamond drill program on their 42 unpatented claim North Benton Claim Group in Benton Township. The purpose of the program was to test an iron formation that returned anomalous gold assays from surface sampling carried out in 1985. Drill targets were defined by ground electromagnetic surveys carried out in 1985. The drill results were not available at the time of writing (December, 1986). In Mallard Township, Weaco Resources completed an airborne magnetic-electromagnetic survey on three claim groups totaling 94 claims. Approximately 300 line kilometres (190 line miles) was flown over the claim groups and the intervening ground (Weaco Resources Limited, personal communication, 1986).

Western Pacific Energy Corporation completed a 14-hole, 1716 m (5630-foot) diamond drill program on their 133 unpatented claim group in Garnet Township. The purpose of the program was to test geophysical targets along a generally northwest-trending zone of chemical sedimentary rocks, metavolcanics, and diorites. The holes were concentrated in the northwestern corner and at the eastern end of the property and were widely spaced in an effort to test as many of the geophysical targets as possible. Results indicate the presence of anomalous concentrations of copper and zinc in sulphide-bearing cherty iron formation at the extreme northwestern part of the property. Anomalous gold values were encountered over narrow widths in three holes completed in the eastern part of the claim group. The best value was from a 0.3 m (1 foot) section that returned 930 ppb gold (0.027 ounce gold per ton) from a fractured, siliceous, carbonate-sericite schist mineralized with pyrite and arsenopyrite. In October of this year, Western Pacific Energy completed a stripping program in three areas which had not been drill tested. Results of the stripping program have not been released (Western Pacific Energy Corporation, personal communication, 1986; Assessment Files, Resident Geologist Office, Timmins).

Other companies and individuals not previously mentioned but actively exploring in the Swayze Economic Geologist's area include:

G. Beith—evaluating the potential of a nickel-copper occurrence in Hong Kong Township

B.P. Canada Incorporated (Selco Mining and Minerals Division)—evaluating a recently optioned 200 unpatented claim group in Muskego and Keith Townships prior to commencing an exploration program in the new year

Consolidated Silver Butte Mines Limited—carried out limited work on portions of their several hundred claims in Osway, Huffman, and Mallard Townships

Esso Minerals Canada—carried out reconnaissance exploration in central Swayze area

A. Maskevich—completed linecutting and ground geophysics on his Keith Township property

Manville Canada Incorporated—completed ground geophysics on unpatented claims in Penhorwood Township

Pelangio-Larder Mines Limited—recently acquired the option on claims in Horwood Township in the vicinity of Blueberry Island on Horwood Lake.

G. Ross, F. Ross, and D. Morin—discovered a new gold showing in Penhorwood Township while staking

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

During 1985 and 1986, grant recipients with projects directly related to the Timmins Resident Geologist area are listed below:

Grant 192 Geochemical Exploration for Gold; Ian Nichol and Gene S. Shelp

Grant 233 The Dating of Ontario's Gold Deposits; A. Masliwec, D. McMaster, and D. York

Grant 236 Au-Quartz Vein and Intrusion-Hosted Cu-Au-Ag-Mo Mineralization, Hollinger-McIntyre Mines, Timmins, Ontario: Geological Characteristics, Structural Examination, Igneous and Hydrothermal Alteration Geochemistry, and Light Stable Isotope (Hydrogen and Oxygen) Geochemistry; P.C. Wood, D.R. Burrows, and E.T.C. Spooner

Grant 256 Cyanide in Gold Deposits; H.P. Schwarcz

Grant 260 Magnetotelluric Mapping of the Destor-Porcupine Fault; J.D. Redman, S.K. Zhao, and D.W. Strangway

Grant 262 Lithological Features and Economic Significance of Reduced Carbonaceous Rocks in Gold Deposits; Graham C. Wilson and John C. Rucklidge

Grant 265 Metal Uptake by Microorganisms: Retardation of Toxic Heavy Metal Dispersion From Tailing Environments, Elliot Lake, Timmins, and Sudbury; H. Mann, F.G. Ferris, T.J. Beveridge, W.S. Fyfe, R. Humphrey, and K. Tazaki

Other Ontario Geoscience Research grant recipients are: Controls on Unusual Gneissic Tonalite/Trondhjemite Hosted Au Mineralization, Renabie Mine, Wawa, Ontario; E.T.C. Spooner and N. Callan (University of Toronto)

Lead Isotope Study of Gold Mineralization in the Dome Mine, Quartz-Fuchsite Vein; J.H. Crocket, R. Moritz, and A.P. Dickin (McMaster University)

Geological Setting of Gold Deposits in the Timmins Mining Camp; R. Mason and D. Brisban (Queen's University)

Platinum Group Elements of Mafic and Ultramafic Rocks; A.J. Naldrett and J. Brugmann (University of Toronto)

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

In 1986, there were no programs conducted by the Precambrian Geology Section in the Timmins Resident Geologist's area. Ontario Geological Survey activities were confined to various interdisciplinary studies that are continuing in the Operation Black River-Matheson (BRIM) area. The four-township block of Clergue, Stock, Bond, and Sheraton Townships, situated at the western end of the BRIM area, lie in the Timmins Resident Geologist's area. All programs are jointly funded by the Ontario Ministry of Northern Development and Mines and the Ontario Ministry of Natural Resources.

GEOPHYSICS/GEOCHEMISTRY SECTION, ENGINEERING AND TERRAIN GEOLOGY SECTION

The geochemical results of the BRIM area 1984 and 1985 sonic drill and backhoe till sampling programs were released in a series of maps during 1986. With the exception of the till portion of the Sheraton Township 1985 drilling, both bedrock and till core samples from all sonic drilling conducted to date in the Timmins Resident Geologists area are currently available for public viewing at the Timmins Drill Core Library.

MINERAL DEPOSITS SECTION

J. Malczak (Geologist, Mineral Deposits Section) continued his investigation of the St. Andrew Goldfields Deposit in Stock Township which commenced in 1984. Work done this year on the St. Andrew Goldfields Deposit included sampling of new underground development and the sampling of drill core from previously known and new mineralized zones. In 1986, initial examinations of the Clavos Deposit in German and Stock Townships and the Moniclerg Prospect in Clergue Township were begun. Core sampling of representative drillholes from the Clavos Deposit and the Moniclerg Prospect was conducted, as well as examination of outcrop at the latter site.

Mr. Malczak's investigations are intended to complement the gold metallogenesis study being conducted by P.J. Whittaker on gold deposits associated with the Pipestone and Destor-Porcupine Fault Zones. These include the St. Andrew Goldfields, the Clavos, and the Moniclerg Deposits as well as deposits further to the east in the BRIM area. This study focuses on the structural, textural, and alteration characteristics, and the associated mineralogy of these selected gold deposits.

A more detailed description of the above programs can be found in Summary of Field Work and Other Activites, 1986, by the Ontario Geological Survey (Ontario Geological Survey, Miscellaneous Paper 132).

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

In 1986, a total of 37 programs were designated for OMEP assistance in the Porcupine Mining Division. Thirty-four of these programs were in the Timmins Resident Geologist area. Total expenditures amounted to $16 615 003. Of this total, $9 661 880 are expenditures eligible for OMEP.

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1980a: Jerome Area (East), District of Sudbury; Ontario Geological Survey, Preliminary Map P.2369, Geological Series, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1979.

1980b: Jerome Area (West), District of Sudbury; Ontario Geological Survey, Preliminary Map P.2370, Geological Series, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1979.

1981: Precambrian Geology of Chester and Yeo Townships, and Parts of Neville and Potier Townships, Sudbury District; Ontario Geological Survey, Preliminary Map P.2449, Geological Series, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1980.

1982: Precambrian Geology of the Pensyl Lake Area, Sudbury District; Ontario Geological Survey, Preliminary Map P.2534, Geological Series, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1981.

1983: Garnet Lake Area, Sudbury District, Ontario Geological Survey, Open File Report 5438, 148p., 15 Tables, 8 photos, 8 figures, and 4 maps.

Tanton, T.L.

1916: Explored Routes in a Belt Traversed by the Canadian Northern Ontario Railway, Between Gogama and Missonga, Sudbury District, Ontario; Geological Survey of Canada, Map 1697, scale 1:253 440 or 1 inch to 4 miles.

Thurston, P.C., Siragusa, G.M., and Sage, R.P.

1977: Geology of the Chapleau Area, Districts of Algoma, Sudbury and Cochrane; Ontario Division of Mines, Geological Report 157, 293p. Accompanied by Maps 2351 and 2352, scale 1:250 000 and Map 2221 scale 1:253 440 or 1 inch to 4 miles.

Todd, E.W.

1925: Groundhog River Area, Sudbury and Cochrane Districts; Ontario Department of Mines, Annual Report for 1924, Volume 33, Part 6, p.1-17. Accompanied by Map 33g, scale 1:95 040 or 1 inch to 1 1/2 miles.

7. Kirkland Lake Resident Geologist's Area, Northern Region

Howard Lovell[1], **Gary Grabowski**[2], **David Guindon**[3], **and Alexander Bath**[4]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[3]Core Library Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[4]Economic Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

INTRODUCTION

The Kirkland Lake Resident Geologist's area coincides with the Larder Lake Mining Division. Assessment work credit assigned in 1986 totaled 631 038 man days, the most in the history of the Larder Lake Mining Division (*see* Table 7.1). At the end of March, 1986, active claims numbered 25 437, a high for this Mining Division. According to "The Explore Report" (Gartley 1986), the 1985 expenditures (the most recent available) for the townships that comprise the Kirkland Lake Resident Geologist area were, for "outside and general exploration", $13 020 718, about 16 percent of the Ontario total. However, this estimate may be low, because the Ontario Mineral Exploration Program (for exploration by only those organizations that do not produce minerals in Ontario) projected expenditures of $9 922 180 for 1986. "Mine and on-property exploration" totaled $1 995 759, about 17 percent of the Ontario total, and "mine and on-property development" expenditures were $39 157 949, about 20 percent of the Ontario total. The total value of production (including iron pellets, gold, silver, barite, and serpentine filler) for 1984, the most recent figure available, was $148 972 525 (Weatherson 1986). Thus, mineral resources revenue in the Kirkland Lake Resident Geologist area for a single 12-month period is estimated to total more than $200 million.

An interpretation of the Mining Act in 1978, regarding the Bear Island Indian Caution laid in 1973, has for the past nine years prevented the recording of mining claims and consequently prevented most exploration and any possible ensuing production in one-quarter of the Larder Lake Mining Division.

The Kirkland Lake Resident Geologist's area, with the area withdrawn from staking through the Bear Island Caution outlined, is shown on Figure 7.1.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Permanent staff includes: Howard Lovell, Resident Geologist; Gary Grabowski, Resource Geologist; and Faye M. Boucher, Administrative Secretary. Geological Assistant Todd Beckett worked an 11-month contract. Temporary staff on contract for specific projects during the summer were: Gina Viskovich, Clerical Typist; and Joe Mihelcic, Geological Assistant, Northern Internship Program. Jennifer Lawrence, Typist, was employed for 23 weeks through the Special Employment Program.

Operation Black River-Matheson employed Alex Bath as Economic Geologist, Bjarne Westin (10 month

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 7.1

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1986	6,973	6,787	24,160	107,108	399,511	48,263	631,038
1985	7,558	5,011	23,974	95,076	276,646	19,517	460,183
1984	7,943	4,492	21,397	93,946	245,542	44,113	473,820
1983	8,354	3,866	17,946	121,213	98,366	15,233	304,770
1982	3,253	5,218	13,458	99,526	133,511	17,926	313,690
1981	5,498	2,697	15,423	69,906	125,459	19,536	247,087
1980	6,299	1,834	12,622	64,454	115,031	10,981	209,357
1979	4,261	1,452	8,157	29,714	25,352	4,990	68,763
1978	1,710	2,065	5,248	32,602	38,100	8,887	87,144
1977	1,826	2,334	5,703	37,101	45,436	1,820	98,992
1976	2,350	2,979	6,712	47,724	42,338	6,220	102,936
1975	2,916	5,010	7,341	45,880	38,047	6,738	98,624
1974	4,757	2,296	9,435	40,678	55,716	4,441	110,165
1973	3,260	3,214	6,974	34,113	35,811	8,150	92,616
1972	3,253	4,749	6,781	39,371	52,351	3,358	106,026
1971	4,065	3,846	8,268	29,433	48,785	4,764	96,047
1970	4,315	3,704	8,049	25,683	28,683	4,133	73,157
1969	3,404	5,273	7,438	50,892	45,713	15,829	130,185
1968	4,171	7,909	9,307	74,649	82,637	5,799	180,437
1967	5,450	7,341	13,045	79,172	29,073	4,032	143,600
1966	7,606	11,101	14,936	117,544	30,971	8,050	182,352
1965	9,331	6,906	18,431	123,129	88,259	6,530	257,029
1964	12,842	3,884	22,912	77,807	32,644	11,725	149,198
1963	4,710	3,895	13,954	95,696	16,241	4,226	138,627
1962	4,675	4,028	13,139	63,003	5,494	5,099	97,219
1961	3,749	4,451	12,492	47,862	5,494	1,118	79,219
1960	5,024	6,747	13,194	75,123	7,296	4,751	104,632
1959	6,419	5,594	14,917	22,947	3,792	1,404	80,322
1958	8,582	7,108	14,902	37,381	7,481	1,941	66,783
1957	4,664	8,212	12,618	95,934	12,593	3,948	139,891
1956	9,673	3,594	16,166	77,879	20,982	6,693	130,894
1955	4,182	3,999	10,087	75,561	3,389	3,529	105,925

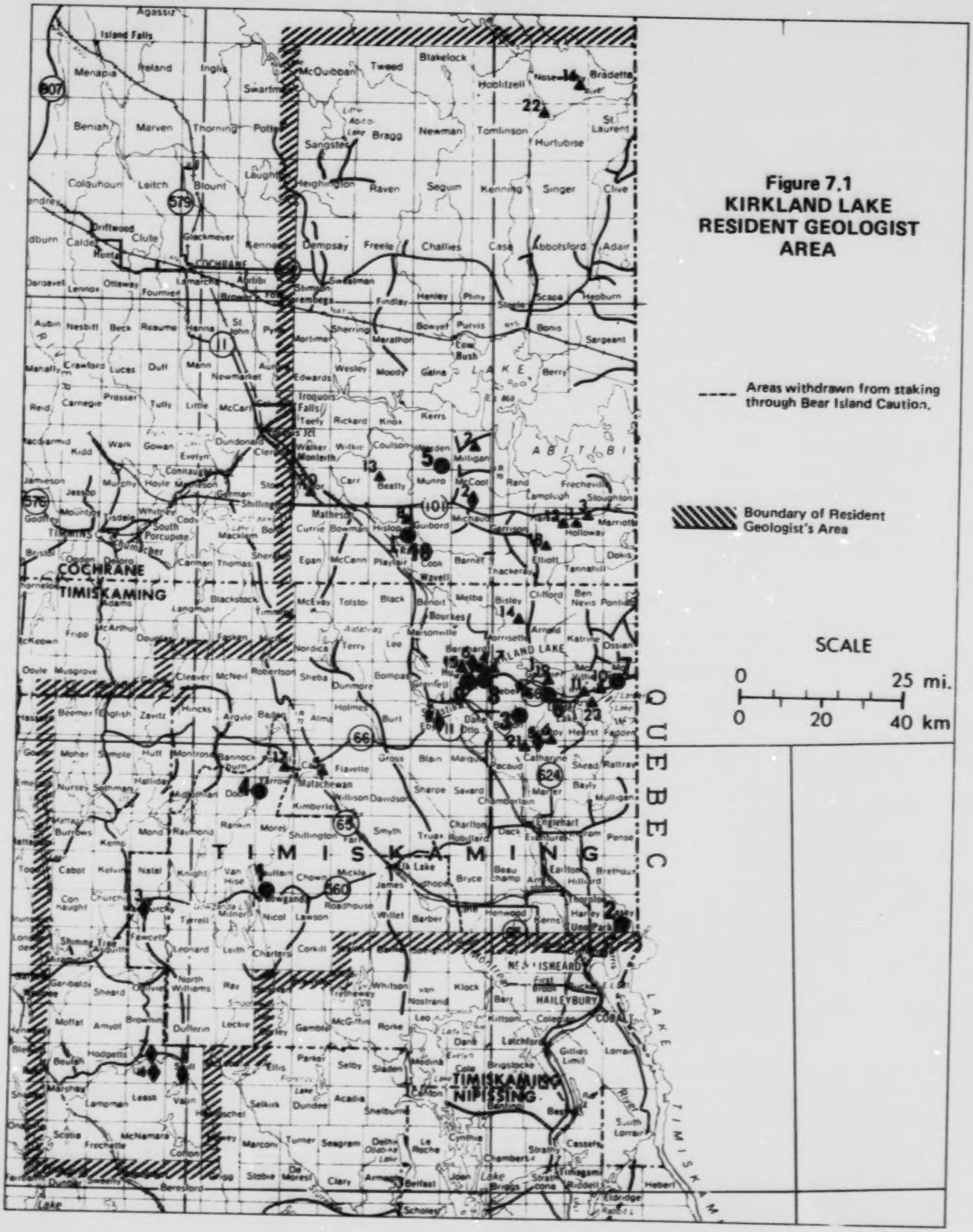

Figure 7.1
KIRKLAND LAKE RESIDENT GEOLOGIST AREA

---- Areas withdrawn from staking through Bear Island Caution.

▨ Boundary of Resident Geologist's Area

SCALE

0 — 25 mi.

0 — 20 — 40 km

COCHRANE
TIMMINS
COCHRANE
TIMISKAMING
TIMISKAMING
TIMISKAMING NIPISSING
KIRKLAND LAKE
NEW LISKEARD
HAILEYBURY
COBALT
QUEBEC
LAKE ABITIBI
LAKE TIMISKAMING
Iroquois Falls
Matheson
Matachewan
Englehart
Elk Lake
Gowganda
Island Falls
Agassiz
Menapia
Ireland
Inglis
McQuibban
Tweed
Blakelock
Hoblitzell
Bradette
St. Laurent
Hurtubise
Benah
Marven
Thorning
Sangster
Bragg
Newman
Tomlinson
Colquhoun
Leitch
Blount
Laughton
Heighington
Raven
Seguin
Kenning
Singer
Clive
Calder
Driftwood
Clute
Glackmeyer
Kennedy
Dempsay
Freele
Challies
Case
Abbotsford
Adair
Lennox
Ottaway
Fournier
Lamarche
Stimson
Findlay
Henley
Pliny
Steele
Scapa
Hepburn
Aubin
Nesbitt
Beck
Reaume
Hanna
St. John
Pyne
Mortimer
Sherring
Marathon
Bowyer
Purvis
Bonis
Sargeant
Mahaffy
Crawford
Lucas
Duff
Mann
Newmarket
Aurora
Edwards
Wesley
Moody
Calina
Berry
Reid
Carnegie
Prosser
Tully
Little
McCart
Teefy
Rickard
Knox
Kerrs
Kidd
Wark
Gowan
Evelyn
Dundonald
Clergue
Walker
Wilkie
Coulson
Warden
Milligan
Jameson
Murphy
Hoyle
Mathieson
German
Stock
Carr
Beatty
Munro
McCool
Rand
Frecheville
Stoughton
Lamplugh
Godfrey
Mountjoy
Tisdale
Whitney
Cody
Macklem
Currie
Bowman
Hislop
Guibord
Michaud
Garrison
Holloway
Marriott
Bristol
Ogden
Deloro
Shaw
Carman
Thomas
Egan
McCann
Playfair
Cook
Barnet
Elliott
Tannahill
Dokis
Adams
Langmuir
Blackstock
McEvay
Tolstoi
Black
Benoit
Melba
Bisley
Clifford
Ben Nevis
Pontiac
McKeown
Fripp
McArthur
Douglas
Bourkes
Maisonville
Morrisette
Arnold
Katrine
Ossian
Nordica
Terry
Lee
Bernhardt
Doyle
Musgrove
Cleaver
McNeil
Robertson
Sheba
Bompas
Dunmore
Grenfell
Lebel
Gauthier
McVittie
Beemer
English
Zavitz
Hincks
Argyle
Baden
Alma
Holmes
Burt
Eby
Dane
Otto
Boston
Pacaud
McFadden
Hearst
Goodwin
Moher
Semple
Hutt
Montrose
Bannockburn
Flavelle
Gross
Blain
Marquis
Catharine
Shead
Rattray
Nursey
Halliday
Doon
Yarrow
Kimberley
Willison
Davidson
Sharpe
Savard
Chamberlain
Marter
Bayly
Mulligan
Burrows
Mond
Raymond
Rankin
Morel
Shillington
Tyrrell
Smyth
Truax
Charlton
Robillard
Dack
Evanturel
Ingram
Pense
Kemp
Cabot
Kelvin
Natal
Knight
Van Hise
Mickle
Chown
Beauchamp
Bryce
Armstrong
Earlton
Bretmour
Hilliard
Connaught
Churchill
Milner
Nicol
Lawson
Roadhouse
James
Willet
Barber
Henwood
Kerns
Harley
Casey
Leonard
Fawcett
Leith
Charters
Corkill
Gillies Limit
Garibaldi
Sheard
Ogilvie
North Williams
Ray
Whitson
van Nostrand
Klock
Bucke
Dymond
Moffat
Amyot
Browning
Dufferin
Leckie
Gamble
McGiffin
Rorke
Leo
Kittson
Coleman
Lorrain
Beulah
Hodgetts
Parker
Selby
Sladen
Medina
Cole
Brigstocke
Marshay
Lampman
Leask
Vallin
Selkirk
Dundee
Acadia
Shelburne
Cynthia
South Lorrain
Scadding
Frechette
McNamara
Corkill
Marconi
Turner
Seagram
Delhi
Le Roche
Chambers
Strathy
Cassels
Temagami
Riddell
Hebert
Stobie
De Morest
Clary
Armand
Belfast
Joan
Briggs
Strathcona
Eldridge
Scholes
Beresford
Dunlop
Sweeny
Latchford
Bastedo
807
579
11
576
101
66
65
560
624

● Producing Mines

1. Agnico-Eagle Mines Limited Castle-Tretheway Mine	Ag, Co
2. Agnico-Eagle Mines Limited Langis Mine	Ag, Co
3. Dominion Foundaries and Steel Company Limited Cliffs of Canada Limited Adams Mine	Fe
4. Extender Minerals of Canada Limited	Barite
5. Hedman Resources Limited.	Serpentine Filler
6. Inco Limited - Queenston Gold Mines Limited McBean Mine	Au, Ag
7. Kerr Addison Mines Limited	Au, Ag
8. Lac Minerals Limited Lake Shore Mine	Au, Ag
9. Lac Minerals Limited Macassa Mine	Au, Ag
10. Pamour Porcupine Mines Limited Ross Mine	Au, Ag, Cu

▲ Properties Under Evaluation

1. American Barrick Resources Corporation	Au
2. Bay Resources et Services Incorporé	Au
3. Canamax Resources Incorporated	Au
4. Eastmaque Gold Mines Limited	Au
5. Falconbridge Limited	Au
6. Golden Shield Resources Limited	Au
7. Goldhunter Explorations Incorporated	Au
8. Goldpost Resources	Au
9. Inco Limited	Au
10. Kerr Addison Mines Limited	Au
11. Lenora Explorations Limited Omega	Au
12. Lenora Explorations Limited Worvest.	Au
13. Maude Lake Gold Mines Limited	Au
14. Monopros Limited	Au
15. Newfields Minerals Incorporated	Au
16. Newmont Exploration of Canada Limited.	Au
17. Pamour Porcupine Mines Limited	Au
18. Perrex Resources Incorporated	Au
19. Queenston Gold Mines Limited.	Au
20. St. Andrew Goldfields Limited	Au
21. Shenandoah Resources Limited.	Au
22. Skeena Resources Limited.	Au
23. Sudbury Contact Mines Limited	Au

◆ Property Visits

1. R. Annett and R. Ferguson	Barite Occurrence
2. Belore Mines Limited	Gold Prospect
3. C. W. Brunet	Copper and Gold Prospect
4. Last Chance Syndicate	Cobalt Occurrence
5. Mirado Nickel Mines Limited	Gold Past Producer
6. Newfields Minerals Incorporated "Kirkland Basin"	Gold Past Producer
7. Onitap Resources Incorporated	Cobalt, Silver, and Gold Occurrences
8. F. and P. Rivard and L. Raitanen	Gold Occurrence

contract) as Geological Assistant, Kamal Kalicharran as Data Folio Geologist, and Pamela Savarie as Secretary.

A contingent of seven Ministry of Natural Resources Junior Rangers stripped soil for three days to improve bedrock exposures for "Gold 86" and other field trips in the Kirkland Lake and Larder Lake areas.

Activities of the Resident Geologist Office included:

1. responding to 2550 inquiries from exploration, mining, and government personnel, and the general public
2. giving talks to five groups interested in geology and mining
3. preparing 26 reports on mineral property examinations, diamond-drill logs, field trips, and technical papers
4. guiding nine geological field trips to Kirkland Lake-Larder Lake area gold occurrences, etc., for groups of mineral explorationists, government, university, and foreign geologists, and two Ontario Ministry of Natural Resources Junior Ranger camps
5. responding to two Road Proposals, two Forest Management Agreements, and several Mining Hazard Land reviews; no Mining Rights were withdrawn in 1986
6. indexing and filing, for ready retrieval, the assessment work representing 631 038 "man days" of exploration
7. indexing and filing approximately 141 articles of technical and scientific interest, adding to a very extensive technical library
8. attending the Canadian Institute of Mining and Metallurgy local, local executive, and District Three Council and/or local meetings at Kirkland Lake, Cobalt, Timmins, and Kingston.

MINING ACTIVITY

During 1986, ten mines operated in the Kirkland Lake Resident Geologist area, five producing gold and by-product silver, two producing silver and by-product cobalt, one producing "self-fluxing" iron ore pellets, one producing barite, and one producing serpentine filler. In addition, shafts were sunk and lateral development begun at one producing and two developing gold mines, and a decline ramp was driven at one gold prospect. Total production by the Larder Lake Mining Division gold mines, at the end of 1985, is shown in Table 7.2.

Mining at the Lake Shore Mine of Lac Minerals Limited advanced below the crown pillar to gold-silver ore at 400 feet (120 m) via a scoop tram decline ramp that has been driven into adjacent Wright-Hargreaves and Teck-Hughes past producing mines as well. The area of the No. 5 shaft to the 3950-foot (1200 m) level is being examined to ascertain whether mining is warranted, and a small amount of low grade ore, sloughed into draw points, was hoisted and milled.

At the Macassa gold-silver Mine of Lac Minerals Limited, sinking of the deepest, single-lift vertical shaft (sump depth 7275 feet (2205 m)) outside of the Republic of South Africa, was completed and production begun. The hoisting capacity from the deepest levels is about 500 tonnes per day. The existing mill may be expanded, or a new mill may be built, having 1000 tonnes per day capacity, to accommodate the Macassa and Lake Shore (Teck Hughes-Wright Hargreaves) production.

Production and milling of gold-silver ore were completed at the McBean Mine is owned jointly by Inco Limited and Queenston Gold Mines Limited and is operated by Inco Limited. Mining was completed to the planned depth and and the pit allowed to begin flooding. A contract was signed with Golden Shield Resources Limited to begin custom milling by the end of January, 1987, at more than half the mill's daily rated capacity of 700 tons (635 tonnes).

Pamour Porcupine Mines Limited planned a $30 million development program for its Ross Mine at Holtyre if exploration indicates that shaft deepening and mill construction are warranted.

EXPLORATION ACTIVITY

American Barrick Resources Corporation completed a 1400-foot (425 m) shaft to access the main ore zone, and drifted on the 500-foot (150 m) and 1150-foot (350 m) levels. Reserves are in excess of 3 000 000 short tons averaging 0.19 Troy ounce gold per short ton undiluted (about 2 722 000 metric tonnes averaging 6.5 g per metric tonne) (Northern Daily News, Kirkland Lake, December 5, 1986). The company announced its intention to invest $50 million to develop the new "Holt-McDermott" Mine underground, and to construct a power line from the Kirkland Lake substation to the mine site and a plant to include a mill of 1500 tons per day capacity. Employment is expected to total 200 persons and gold production is expected to begin in 1988.

Bay Resources et Services Incorporé sampled its esker gold property in the Warden-Milligan Townships area, and experimented using a barge on a kettle lake to centrifuge gold from black sand and gravel.

Canamax Resources Incorporated diamond drilled several thousand metres. Several of the holes were drilled at the Canamax "East" zone in Holloway Township, which to date contains an indicated 578 000 tons grading 0.246 ounce gold per ton (about 525 000 tonnes at 8.4 g/t) (Canamax Resources Incorporated, 1985 annual report), and is open at depth. Canamax plans to drive a decline ramp in 1987.

Eastmaque Gold Mines Limited (The Northern Miner, November 3, 1986) has reserves of 7 700 000 short tons of Kirkland Lake tailings grading 0.038 ounce gold per ton (about 7 million metric tonnes at 1.30 g/t) which are planned to be recovered by a barge pumping tailings to a 2000 tons per day floatation circuit to be built. The resultant concentrate will be shipped to the Horne Mill for refining, beginning in September, 1987.

Falconbridge Limited diamond drilled for gold east of Matachewan.

TABLE 7.2 GOLD PRODUCTION FROM ALL MINES IN ONTARIO'S LARDER LAKE MINING DIVISION TO END OF 1985 (COMPILED BY KIRKLAND LAKE RESIDENT GEOLOGIST OFFICE):

Mine	Township	Tons	Production		Grade	Yrs. of
		Milled	(oz. Au)	(oz. Ag)	(oz Au/T)	Production
Aljo	Beatty	2,333	42	5	0.02	1940
American Eagle	Munro	60	40	nil	0.67	1911
Argyll	Beatty	25	30	nil	1.20	1918
Ashley	Bannockburn	157,076	50,123	7,644	0.32	1932-1936
Baldwin	Eby	81	43	81	0.53	1929,1938
Barry Hollinger	Pacaud	267,741	77,000	8,502	0.26	1918,25-36,44-46
Bidgood	Lebel	586,367	160,184	72,468	0.27	1934-39,1951
Blue Quartz	Beatty	500	81	33	0.16	1923,26,28,34
Bourkes	Benoit	1,298	277	50	0.21	1918,36-38
Canadian Arrow	Hislop	279,593	17,045	nil	0.06	1980-1983
Cathroy Larder	McElroy	22,250	3,227	993	0.15	1941-44,47,57
**Centre Hill	Munro	327,007	422	36,883	.001	1967-1970
Chesterville	McGarry	3,260,439	358,880	19,371	0.11	1930-1952
Croesus	Munro	5,333	14,859	1,423	2.79	1915-18,23,31-36
**Ethel Copper	James	8,500	69	2,484	0.01	1962-1967
Gateford (Swastika)	Teck	103,684	30,068	nil	0.29	1910-1947***
Golden Summit	Maisonville	737	57	nil	0.08	1936-37,45
Gold Hill	Catharine	4,616	660	nil	0.14	1927-28
Gold Pyramid	Guibord	175	36	nil	0.21	1911
Hudson-Rand	Teck	6,496	483	143	0.07	1922
*Kerr Addison	McGarry	37,576,969	10,182,873	566,322	0.28	1911,1938
Kerr Addison (Murphy)	Garrison	70,000	9,000	nil	0.12	1937
Kirkland Lake	Teck	3,140,283	1,172,955	130,579	0.37	1916-1960
Kirkland Townsite	Teck	4,230	1,921	168	0.45	1958-1959
Laguerre	McVittie	40,514	7,568	1,383	0.19	1937-1939
*Lake Shore	Teck	17,064,283	8,559,668	1,955,132	0.51	1918-65,1982-
*Macassa	Teck	6,024,835	2,637,547	425,417	0.44	1933-
Matachewan Consolidated	Powell	3,525,200	378,101	133,210	0.11	1934-1954
Miller Independence	Pacaud	31	59	70	1.90	1918
Moffat-Hall	Lebel	16,388	4,780	1,149	0.29	1934-1935
Morris Kirkland	Lebel	127,253	16,999	29,754	0.13	1936-38,40-42
New Telluride	Skead	104	62	50	0.60	1931-1932
Omega	McVittie	1,615,081	214,098	29,290	0.13	1913,26-28,36-47
Queenston	Gauthier	1,054	177	2,380	0.17	1941
*Queenston-INCO (McBean)	Gauthier	357,636	28,502	nil	0.08	1984-1986
Ronda	Macmurchy	24,592	2,727	4,830	0.11	1939
*Ross	Hislop	6,038,000	932,396	1,544,795	0.15	1936-
**Ryan Lake	Powell	184,790	1,352	36,141	0.01	1948-57,62-64
Stairs	Midlothian	15,835	3,573	1,767	0.23	1965-1966
Sylvanite	Teck	5,049,536	1,674,808	337,956	0.33	1927-1961
Teck Hughes	Teck	9,565,302	3,709,007	501,657	0.38	1917-1968
Toburn	Teck	1,186,316	570,659	135,238	0.48	1912-1953***
Tyranite	Tyrrell	223,810	31,352	4,860	0.14	1939-1942
Upper Beaver	Gauthier	580,562	140,709	59,167	0.24	1913-1972***
Upper Canada	Gauthier	4,648,984	1,398,291	589,696	0.30	1938-1971
White-Guyatt	Munro	50	10	nil	0.20	1911
Wright Hargreaves	Teck	9,934,327	4,821,296	853,643	0.49	1921-1965
Young-Davidson	Powell	6,213,272	585,690	131,939	0.10	1934-1957
Total		118,214,017	37,769,728	7,534,255	0.32	

*Producer in 1985
**Base Metal Mine
***Intermittent Production

Golden Shield Resources Limited dewatered the shaft at the Catharine Township gold past producer of Mirado Nickel Mines Limited and diamond drilled underground and on surface. Road building directly towards the McBean Mill was started after a contract was signed to begin milling open pit production at a rate of 400 to 500 tons (about 350 to 450 tonnes) per day in January, 1987 (The Northern Miner, December 8, 1986). Reserves have been increased to 496 509 tons grading 0.33 ounce gold per ton (450 423 tonnes grading 11.3 g/t) fully diluted (The Northern Miner, December 8,1986).

Goldhunter Explorations Incorporated stripped the Federal Kirkland Prospect and, from channel samples, obtained several assays grading 0.3 ounce gold per ton across 3 feet (10 g/t across 1 m; the Northern Miner, October 6, 1986).

Goldpost Resources began driving a decline ramp on their Hislop Township "Gibson West" Zone and began diamond drilling to expand the nearby New Kelore Mines Limited Deposit containing diamond drill-indicated reserves of 400 000 tons grading 0.17 ounce gold per ton (363 000 tonnes at 5.8 g/t) to the 500-foot (150 m) level (Canadian Mines Handbook, 1986-87).

Inco Limited diamond drilled its Esker Zone joint venture with Queenston Gold Mines Limited.

Kerr Addison Mines Limited and Eldor Resources Limited operated five diamond drills simultaneously on their International Larder Resources Incorporated Option. Published reserves, given in short tons grading ounce gold per ton (tonnes grading g/t) are: on the Cheminis portion, 272 000 at 0.174 (246 754 at 5.97); on Barber Lake, 100 722 at 0.194 (91 374 at 6.65); and on Fernland, 440 000 at 0.169 (399 161 at 5.79) to a relatively shallow depth (The Northern Miner, December 1, 1986).

Lenora Explorations Limited trucked a bulk sample of crown pillar from the Omega gold past producer to the Belmoral Mill for tests, and continued diamond drilling.

On the Worvest Prospect of Lenora Explorations Limited joint venture with American Barrick Resources Corporation, gold ore-grade widths were intersected by diamond drilling along strike from American Barrick's developing "Holt-McDermott" Mine.

Maude Lake Gold Mines Limited diamond drilled additional holes at its Beatty Township "Argyll" gold deposit and completed a feasibility study for shaft-sinking, planned to start in 1987.

Near Esker Lakes Provincial Park, Monopros Limited made Ontario's first discovery of diamonds in bedrock. The kimberlite host rock contains inclusions of Ordovician limestone. This discovery almost doubles the known length of the Lake Timiskaming Paleozoic Outlier.

Newfields Minerals Incorporated spent about $2 million diamond drilling the Kirkland Lake "North Break". Many holes are 3000 feet (about 1000 m) deep vertically and were subsequently wedged laterally to intersect the projected gold zones.

Prior to break-up, Newmont Exploration of Canada Limited diamond drilled in Noseworthy-Bradette Townships on property optioned from Golden Shield Resources Limited and Consolidated CSA Minerals Corporation, intersecting 24.7 feet grading 0.12 ounce gold per ton (7.5 m at 4.1 g/t) (The Northern Miner, January 27, 1986). These prospects are roughly along strike west from the Casa Berardi discoveries in Quebec.

Pamour Porcupine Mines Limited had two diamond drills involved in exploration work in the vicinity of the Matachewan area gold past producers, Young-Davidson Mines Limited and Matachewan Consolidated Mines Limited.

Perrex Resources Incorporated began diamond drilling its extensive claim holdings in the Harker-Holloway Townships area.

Queenston Gold Mines Limited stripped soil from, and diamond drilled from the surface, the "L" zone of its Upper Canada gold past producer, and reappraised underground plans and sections compiled before the mine shut down in 1971 (when the price of gold was $35 per ounce).

St. Andrew Goldfields Limited and Esso Minerals Canada Limited sank a 565-foot (170 m) deep exploratory shaft on the Taylor Township "Porphyry Zone". Drifting (1300 feet (300 m)) on two levels, raising (300 feet (90 m)), and diamond drilling (5000 feet (1500 m)) are in progress. The nearby "Shoot Zone" reserves determined as a result of diamond drilling are 1 090 000 tons at 0.126 ounce gold per ton (about 990 000 tonnes at 4.3 g/t), according to the June 30, 1985 report of Quebec Sturgeon River Mines Limited.

Shenandoah Resources Limited diamond drilled in Boston, McElroy, Pacaud, and Catharine Townships.

Skeena Resources Limited prepared to spend $1 million exploring the Noseworthy-Tomlinson-Hurtubise Townships claims of Noranda Exploration Company Limited.

Sudbury Contact Mines Limited carried out diamond drilling both, in the Village of Larder Lake, and from an offshore barge, stabilized by 4 rods spudded into lake bottom through 20 feet (6 m) of water depth. Reserves to date are 50 680 tons averaging 0.128 ounce gold per ton (46 000 tonnes averaging 4.4 g/t) in the Laguerre Zone, 26 100 tons averaging 0.205 ounce gold per ton (24 000 tonnes averaging 7.0 g/t) in the Knutson Zone, and about 113 000 tons averaging 0.09 ounce gold per ton (103 000 tonnes averaging 3.1 g/t) in the Island Zone.

DRILL CORE LIBRARY by Dave Guindon

The Drill Core Storage Library (Lithotheque) for the Larder Lake Mining Division was opened in June, 1984. At present, 145 440 m of core are stored (119 099 m inside and 26 341 m outside), representing 215 075 m of drilling.

TABLE 7.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM - Airborne Electromagnetic Survey
Ag - Silver
AMag - Airborne Magnetic Survey
ARad - Airborne Radiometric Survey
ARes - Airborne Resistivity Survey
Assess - Assessment Work
Au - Gold
BM - Base Metals
CS - Core Samples
D - Donation

DD - Diamond Drilling
Gc - Geochemical Survey
GL - Geological Survey
HLEM - Horizontal Loop Electromagnetic Survey
IP - Induced Polarization Survey
Mag - Magnetic Survey
OMEP - Ontario Mineral Exploration Program
OVD - Overburden Drilling
Rad - Radiometric Survey
Res - Resistivity Survey

RS - Remote Sensing
rTr - Rock Trenching
SA - Sampling, Assays
SP - Self Potential Survey
STr - Soil Trenching
UG - Underground Work
VEM - Vertical Loop Electromagnetic Survey
VLF-EM - Very Low Frequency Electromagnetic Survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Abbotsford Adair	32E/04	Gold Hill Res. Inc. "Double A Property"	Au	Assess	SA	1985	2.8720
Adair	32E/04	Gold Hill Res. Inc. "Double A Property"	SEE	UNDER	ABBOTSFORD TOWNSHIP		
Alma Holmes	42A/02	Falconbridge Ltd. "North Grid"	Au	Assess	VLF-EM	1986	2.9445
Alma Holmes	42A/02	Falconbridge Ltd. "South Grid"	Au	Assess	VLF-EM	1986	2.9445
Alma	42A/02	Northclaim Res. Inc.	Au	Assess	STr rTr DD (2) 210'	1985 1985	
Argyle Hincks, Montrose	41P/15	Canamax Resources Inc. "Montrose 1"	Au	Assess	DD (5) 3,295'	1985	
Argyle	42A/02	Duration Mines Ltd.	Au	Assess	OVD (15) 1,040'	1986	2.9459
Argyle	42A/02	Fox, P. "Phil Fox Claims"	Au	Assess	STr	1985	
Argyle	42A/02	Fox, P. "Tom Fox Claims"	Au	Assess	VLF-EM	1985	2.8688
Argyle	42A/02	Petromet Res. Ltd. "Ashley Property"	Au	Assess	DD (1) 290' CS	1986	
Arnold	32D/04	Lac Minerals Ltd. "Grid A 14"	Au	Assess	Mag	1986	2.9242
Arnold	32D/04	Lac Minerals Ltd. "Grid A 18"	Au	Assess	DD (1) 508' SA	1986 1985	2.9539
Asquith Cabot Churchill Connaught	41P/11	Manex Expl. Serv. Ltd.	Au	Assess	AEM-VLF AMag	1984	2.7339
Asquith	41P/11	Sullivan, W.J.	Au	Assess	STr	1985	
Asquith	41P/11	Yoder, A.	Au	Assess	STr	1986	
Baden	42A/02	Hanson Mineral Exploration Ltd.	Au	Assess	DD (3) 347' D SA	1985	
Baden	42A/02	Premier Expl. Inc.	Au	Assess	AMag AEM-VLF	1986	2.9522
Bannockburn	41P/15	George, J.	Au	Assess	STr rTr	1985 1986	
Bannockburn	41P/15	Kiernicki, F.	Au	Assess	STr	1985	
Barnet	42A/08	Kiernicki, F.; Leahy, M.	Au	Assess	AEM-VLF AMag	1986	2.9024
Barnet	42A/08	Peter Island Res. Inc.	Au	Assess	DD (1) 366'	1985	
Barnet Cook, Guibord Melba, Michaud	42A/08	St. Joe Canada Inc.	Au	Assess	Mag AMag AEM-VLF	1986 1986	2.8826 2.9389
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Bennett- Beatty Group"	Au	OMEP	Expl. Report	1985	63.4481
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Main Group"	Au	Assess OMEP OMEP D	DD (4) 739' SA UG DD (55) 6,053' CS	1985 1982 1983 1986	2.8862 63.4481 63.4259

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Salve Lake Group"	Au	OMEP	GL	1985	63.4481
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Salve West Group"	Au	Assess D	DD (3) 1,810' SA IP OVD (15) 1,310' CS	1985 1985 1986 1986 1986	2.8618 2.8860 2.8976 2.8999
Beatty	42A/09	Parsons, G.E.	Au	Assess	Rad VLF-EM Mag Rad VLF-EM GL	1985 1985 1985	2.8637 2.8777 2.8778
Beemer	42A/03	Marjel Resources Inc.	Au	Assess	Mag	1985	2.8616
Ben Nevis	32D/05	Lac Minerals Ltd. "Grid BN 5"	Au	Assess	Mag	1986	2.9254
Ben Nevis	32D/05	Lac Minerals Ltd. "Grid BN 11"	Au	Assess	Mag	1986	2.9253
Ben Nevis	32D/05	Lac Minerals Ltd. "Grid BN 17"	Au	Assess	Mag	1986	2.9251
Ben Nevis Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 8"	Au	Assess	Mag	1986	2.9256
Benoit Cook	42A/08	Domego Res. Ltd. "Black River Prop."	Au	Assess	GL	1986	2.8904
Benoit	42A/08	Domego Res. Ltd. "Highway 11 Prop."	Au	Assess	GL Gc	1986	2.8903
Benoit Cook	42A/08	Golden Cradle Res. Ltd. "Black River Claim Group"	Au	OMEP	Mag EM-VLF	1984	2.6400
Benoit	42A/08	Golden Cradle Res. Ltd. "Highway 11 Group"	Au	OMEP	Mag VLF-EM	1984	2.6401
Benoit Melba	42A/08	Lac Minerals Ltd. "Grid ME 27"	Au	Assess	Mag	1986	2.9241
Benoit	42A/08	Rodholm, C.	Au	Assess	SA STr	1985 1986	2.8960
Bernhardt	42A/01	Lac Minerals Ltd. "Grid BE 2"	Au	Assess	Mag	1986	2.9244
Bernhardt	42A/01	Lac Minerals Ltd. "Grid BE 9"	Au	Assess	Mag	1986	2.9245
Bernhardt Maisonville	42A/01	Longbow Lake Expl. Syndicate	Au	Assess	OVD (54) 1,245'	1986	2.9061
Bernhardt	42A/01	McCormack, D.	Au	Assess	Gc	1986	2.9188
Bernhardt Morrisette Teck	42A/01	O'Connor, F.T.	Au	Assess	DD (2) 605' Mag VLF-EM	1986 1986	 2.9147
Bernhardt	42A/01	Premier Expl. Inc. "Blue Mountain Prop."	Au	Assess	GL SA	1985	2.8610
Bisley	32D/05	Lac Minerals Ltd. "Grid B 17"	Au	Assess	DD (1) 527'	1985	
Bisley	32D/05	Lac Minerals Ltd. "Grid B 30"	Au	Assess	Mag	1986	2.9243
Black	42A/08	Coutts, R.A.	Au	D D	DD (4) 436' STr rTr	1964 1964	
Blakelock	32E/08	Deerfoot Res. Inc.	Au	Assess	Mag HLEM GL IP	1986 1986 1986	2.9238 2.9270 2.9441
Blakelock Newman	32E/08	Core Energy Corp.	Au	Assess	Mag HLEM	1986	2.9282
Bompas Grenfell, Lee Maisonville	42A/01	Glen Auden Res. Ltd. "Grenfell Prop."	Au	D D Assess Assess	DD (10) 1,937' STr rTr Mag GL AMag AEM-VLF	1986 1986 1986 1986	 2.8629 2.8803
Bompas	42A/01	Kinbauri Gold Corp.	Au	Assess	VLF-EM Mag IP	1986 1986 1986	2.8852 2.9056 2.9058

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Bompas	42A/01	Stewart, A.K.	Au	Assess	SA Mag	1986 1986	2.9235 2.9305
Bonis Northeast Bay Steele	32D/13	Utah Mines Ltd. "Lake Abitibi Gold Property"	Au	Assess	AMag	1986	2.9369
Boston McElroy	32D/04	Bishop, J.	Au	Assess	SA	1985	2.8739
Boston Pacaud	31M/13	Perron, A.N. "Barry Hollinger Property"	Au	Assess	GL GL VLF-EM SA	1986 1986	2.9306 2.9401
Bowman	42A/08	Noranda Expl. Co. Ltd.	Au	Assess	VLF-EM Mag HL-EM	1986 1986	2.8836 2.9265
Bowman	42A/07	St. Joe Canada Inc.	Au	Assess	OVD (15) 1 400'	1985	2.9375
Bradette	32E/12	Canadian Nickel Co. Ltd. "Casa Berardi Project"	Au	Assess	Mag IP	1985	2.8664
Bradette Noseworthy	32E/05 32E/12	Newmont Expl. of Canada Ltd. "Mikwam Property"	Au	Assess	DD (15) 11,622' IP HLEM DD (2) 1,899'	1985 1985 1986	 2.8741
Bradette	32E/12	Noranda Expl. Co. Ltd. "Bradette 1-80"	Au	Assess	OVD (6) 656'	1985	2.8774
Bradette Noseworthy	32E/05	Noranda Expl. Co. Ltd. "Bradette 1-82"	Au	Assess	OVD (5) 714' DD (1) 750'	1985 1986	2.8774
Bragg Tweed	42H/08	Glen Auden Res. Ltd.	Au	Assess	OVD (31) 3,649'	1986	2.9444
Bryce	41P/09	McAdam Resources Inc.	Au	Assess	Mag	1986	2.9022
Bryce	41P/09	Morris, J. "Group II"	Au	Assess	VLF-EM	1986	2.9232
Burt Holmes	42A/01	Chevron Minerals Ltd.	Au	Assess	DD (2) 757' OVD (7) 1,199' GL	1984 1985 1986	 2.9440 2.9513
Cabot	41P/11	Dee, A.	Au	Assess	STr rTr	1985 1986	
Cabot	41P/11	Manwa Expl. Serv. Ltd.	SEE	UNDER	ASQUITH TOWNSHIP		
Cairo	41P/15	Asarco Expl. Co. of Canada Ltd.	Au	Assess	STr SA	1986 1986	 2.9417
Cairo	41P/11	Comstate Res. Ltd. "Montreal River Prop."	Au	Assess	Gc	1985	2.9273
Cairo	41P/15	Falconbridge Ltd.	Au	Assess	AEM-VLF AMag	1985	2.8706
Cairo Flavelle Holmes	41P/15 41P/16 42A/01	Falconbridge Ltd. "Flavelle-Holmes Group"	Au	Assess	AEM-VLF AMag	1986	2.9054
Cairo	41P/15	Falconbridge Ltd. "Goldhunter Option"	Au	Assess	DD (12) 5,796'	1986	
Carr	42A/09 42A/10	Canamax Res. Inc. "Carr 8"	Au	Assess	DD (1) 660'	1986	
Carr Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Wilkie-Carr Group"	Au	Assess OMEP	OVD (14) 717' Expl. Report	1986 1985	2.8998 63.4481
Casey	31M/12	Seal River Expl. Ltd. "Casey Mountain Prop"	Au	Assess	AEM-VLF AMag GL	1986	2.9330
Catharine	31M/13	Bishop, J.	Au	Assess	STr	1986	
Catharine Skead	31M/13	Cominco Ltd. "Cathroy-Perron Prop.	Au	Assess	OVD (12) 334' Mag VLF-EM OVD (2) 309'	1985 1985 1985	2.8742 2.8742 2.8605
Catharine McElroy	31M/13 32D/04	Golden Shield Res. Ltd. "Cathroy-Larder Gold Property"	Au	D	GL	1985	
Catharine	31M/13	Hill, R.	Au	Assess	DD (1) 107'	1986	
Catharine	31P/13	Kosy, G. & R.	Au	Assess	DD (1) 220'	1986	

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Catharine	31M/13	Perron, A.H. "Catharine Ten Grp."	Au	Assess	VLF-EM	1986	2.9136
Catharine	31M/13	Perron, A.H. "Misema Eight Grid"	Au	Assess	VLF-EM STr	1986 1986	2.9137
Catharine	31M/13	Teck Explorations Ltd. "Block II"	Au	Assess	Mag	1986	2.8879
Catharine	31M/13	Teck Explorations Ltd. "Block III"	Au	Assess	Mag GL	1986 1986	2.8880 2.9410
Chesney Bay Iroquois Point Kerrs, Lamplugh Milligan, Rand Rayner Lake	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	Au	Assess	AMag AEM-VLF ARes	1985	2.9124
Chesney Bay Kerrs Rayner Lake	42A/09	Noranda Expl. Co. Ltd. "Kerrs 1-77"	Au	Assess	DD (2) 1,387'	1986	
Churchill	41P/11	Cashaback, A.	Au	Assess	rTr	1986	
Churchill	41P/11	Manwa Expl. Serv. Ltd.	SEE	UNDER	ASQUITH TOWNSHIP		
Churchill	41P/11	McBride, W.	Au	D	rTr STr	1972	
Churchill	41P/11	Silver Princess Res. Inc.	Au	OMEP OMEP	IP Gc DD (7) 2,671'	1983 1983	63.4315 63.4315
Churchill	41P/11	Vellow, P.	Au	Assess	STr	1985	
Cleaver	42A/02	Asarco Expl. Co. of Canada Ltd. "Hawk Project"	Au	Assess	OVD (22) 1,527'	1986	2.9376
Clifford	32D/05	Croxall, J. & Allsopp, A.	Au	Assess	rTr SA	1985 1986	 2.9367
Clifford	32D/05	Lac Minerals Ltd. "Grid C 4"	Au	Assess	DD (1) 508' SA	1985 1986	 2.9280
Clifford	32D/05	Lac Minerals Ltd. "Grid C 14"	Au	Assess	Mag	1986	2.9255
Clifford	32D/05	Sullivan Res. Ltd.	Au	Assess	VLF-EM IP	1986	2.9474
Connaught	41P/11	Manwa Expl. Serv. Ltd.	SEE	UNDER	ASQUITH TOWNSHIP		
Cook	42A/08	Bennett, R.A.	Au	Assess	VLF-EM	1986	2.9199
Cook	42A/08	Domego Res. Ltd. "Black River Prop."	SEE	UNDER	BENOIT TOWNSHIP		
Cook	42A/08	Golden Cradle Res. Ltd. "Black River Claim Group"	SEE	UNDER	BENOIT TOWNSHIP		
Cook	42A/08	McCormack, D.	Au	Assess	Mag VLF-EM	1985	2.8738
Cook	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP		
Cook	42A/08	Wilzel Res. Ltd.	Au	Assess	Mag VLF-EM	1986	2.9519
Coulson	42A/09	Campsall, L.	Au	Assess	rTr	1986	
Coulson	42A/09	Kennedy, W.	Au	Assess	rTr STr	1986	
Currie	42A/07	Chevron Minerals Ltd.	Au	Assess	DD (1) 868' Mag GL OVD (10) 1,575'	1985 1985 1985 1986	 2.7872 2.8087 2.8830
Currie	42A/07	Edmunds, D., Larche, D. and Pye, K.	Au	Assess	Mag	1986	2.9005
Eby	42A/01	Anderson, A.	Au	Assess	GL VLF-EM Mag	1986	2.8789
Eby Otto	42A/01	Lenora Expl. Ltd.	Au	OMEP	AMag AEM	1985	63.4278
Eby	42A/01	Mary Ellen Resources "Eby Group"	Au	Assess	Mag VLF-EM GL Gc	1985	2.8661
Eby	42A/01	Perron, A.H. "Dead Man Mine"	Au	Assess	STr	1986	
Eby	42A/01	Perron, A.H. "Eby 66"	Au	Assess	Mag VLF-EM	1986	2.9042

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Eby	42A/01	Rivard, F.	Au	Assess	STr rTr DD (1) 300' CS	1985 1985	
Elliott	32D/05	Golden Harker Expl. Ltd.	Au	Assess	Mag Gc	1986	2.8977
Elliott	32D/05	Lac Minerals Ltd. "Grid EL 4"	Au	Assess	Mag	1986	2.9250
Elliott Harker	32D/05	Ferrex Res. Inc. "Ghost Lake Area"	Au	Assess	AEM-VLF AMag	1985	2.8657
Elliott Harker, Thackeray	32D/05	Ferrex Res. Inc. "Ghost River Area"	Au	Assess	AEM-VLF AMag	1985	2.8854
Elliott	32D/05	Union Mining Corp.	Au	Assess	VLF-EM	1985	2.8719
Flavelle	41P/15 41P/16 42A/01	Falconbridge Ltd. "Flavelle-Holmes Group"	SEE	UNDER	CAIRO TOWNSHIP		
Flavelle	42A/01	Rio Algom Expl. Inc.	Au	Assess	SA	1986	2.9236
Flavelle Holmes	41A/01 41P/16	Rio Algom Expl. Inc. "Cunningham Option"	Au	Assess	Mag VLF-EM DD (3) 1,710'	1985 1985	2.8926
Frechette	41P/03	Jedburgh Res. Ltd.	Au	Assess	Gc DD (28) 4,575'	1985	2.8364
Fretcheville Stoughton	32D/12	Accord Resources Inc.	Au	Assess	AEM-VLF AEM AMag AMag AEM-VLF AVEM	1986 1986 1986	2.9009 2.9009 2.9226
Fretcheville	32D/12	Bay Resources Inc. "Utex Claim Group"	Au	Assess	Mag	1986	2.9067
Fretcheville Holloway, Marriott Stoughton	32D/12	Canamax Res. Inc. "Marriott-1"	Au	OMEP	IP Mag HLEM GL	1983	63.4262
Fretcheville Stoughton	32D/12	Edda Res. Inc.	Au	Assess	AEM-VLF AMag AEM	1986	2.9123
Fretcheville	32D/12	Hartley, D. & Harvey, L.	Au	Assess	AEM-VLF AMag	1986	2.9060
Fretcheville	32D/12	Kidd Creek Mines Ltd. "Fretcheville 55"	Au	Assess	Mag VLF-EM HLEM	1985	2.8624
Fretcheville	32D/12	Noranda Expl. Co. Ltd. "Fretcheville East"	Au	Assess	GL Gc	1986	2.8885
Fretcheville	32D/12	Noranda Expl. Co. Ltd. "Fretcheville West"	Au	Assess	GL HLEM VLF-EM HLEM Mag	1986 1986	2.8773 2.9340
Fretcheville	32D/12	St. Joe Canada Inc. "Fretchevill South Property"	Au	Assess	GL	1986	2.9390
Garrison	32D/12	Bayne, A.S.	Au	Assess	Mag VLF-EM	1986	2.8923
Garrison	32D/05 32D/12	Chapman, S.F.	Au	Assess	AMag AEM-VLF	1985	2.8989
Garrison	32D/05	Falconbridge Nickel Mines Ltd. "Canyon Claims"	Au	Assess	DD (2) 666'	1985	
Garrison	32D/05	Falconbridge Ltd. "Garrison Creek Proj." "PN 605"	Au	OMEP OMEP	DD (6) 8,725' GL IP	1985 1985	
Garrison	32D/05	Garrison Gold Inc. "Dewhirst Lake Prop."	Au	Assess	Mag GL VLF-EM Mag	1985 1985	2.8600 2.8486
Garrison	32D/05	Hobbs, L.G. "Garrison 4 Prop."	Au	Assess	HLEM	1986	2.9472
Garrison	32D/12	Jonpol Expl. Ltd.	Au	Assess	DD (1) 510'	1986	
Garrison Thackeray	32D/05	Kerr Addison Mines Ltd. "Kerr-Garrison Property"	Au	Assess	OVD (109) 9,312'	1985	2.8093
Garrison	32D/05	Lac Minerals Ltd.	Au	Assess	VLF-EM Mag	1986	2.9413
Garrison Michaud	42A/08	Nahanni Mines Ltd. "Oct. & Sept. Grid"	Au	OMEP	DD (1) 501' Mag VLF HLEM GL	1983 1983	63.4313
Garrison	32D/05	Union Mining Corp.	Au	Assess	VEM GL	1986	2.9428

TABLE 7.3 Continued

Location	NTS	File Name.	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Gauthier	32D/04	Cons. Thompson-Lundmark Gold Mines Ltd.	Au	Assess	DD (3) 2,099'	1985	
Gauthier	32D/04	Cons. Thompson-Lundmark Gold Mines Ltd. "Gauthier Grp. F"	Au	Assess	DD (1) 351'	1986	
Gauthier	32D/04	Falconbridge Ltd. "MacGregor Option"	Au	Assess	DD (1) 666'	1985	
Gauthier	32D/04	Hill, R. "Moose Crossing Prop."	Au	Assess	DD (1) 188' STr	1985	
Gauthier	32D/04	Jascan Res. Inc.	Au	Assess	OVD (9) 71'	1986	2.9017
Gauthier	32D/04	Kerr Addison Mines Ltd. "Kerr-Gauthier Property"	Au	Assess	HLEM Mag	1985	2.8550
Gauthier	32D/04	Lac Minerals Ltd. "Gauthier Project"	Au	Assess	Mag VLF-EM DD (2) 1,432'	1985 1986	2.8689
Gauthier	32D/04	MacGregor, R.A.	Au	Assess	Mag SA	1985	2.8272
Gauthier	32D/04	MacGregor, R.A. "Beaverhouse Road Grp."	Au	Assess	VLF-EM	1986	2.9114
Gauthier	32D/04	MacGregor, R.A. "Claim 800064"	Au	Assess	Mag GL VLF-EM Gc VLF-EM	1985 1986	2.8465 2.9275
Gauthier McVittie	32D/04	MacGregor, R.A. "Misema River Group"	Au	Assess	VLF-EM Mag GL VLF-EM	1985 1986	2.8767 2.9116
Gauthier	32D/04	Perron, A.H. "Northland Grid"	Au	Assess	Gc VLF-EM	1985	2.8631
Gauthier	32D/04	657873 Ontario Inc.	Au	Assess	STr GL VLF-EM Mag	1986 1986	 2.9302
Grenfell Teck	42A/01	Flint Rock Mines Ltd.	Au	Assess	GL SA	1986	2.9301
Grenfell	42A/01	Glen Auden Res. Ltd. "Grenfell Prop."	SEE	UNDER	BOMPAS TOWNSHIP		
Grenfell	42A/01	Hurd, D.F.	Au	Assess	STr	1986	
Grenfell	42A/01	Neighbors Res. Ltd.	Au	Assess	DD (1) 544' Mag	1986 1986	 2.9346
Grenfell	42A/01	Perron, A.H. "Stitts Claims"	Au	Assess	STr	1986	
Grenfell	42A/01	Perron, A.H. "Stitt 2 Claims"	Au	Assess	GL	1985	2.8615
Grenfell	42A/01	Perron, A.H. "Stitt 3 Claims"	Au	Assess	GL	1986	2.9228
Grenfell	42A/01	Sirola, D.G. "Orlanda Res. Opt."	Au	Assess	DD (1) 427' CS SA	1985	2.8878
Grenfell	42A/01	Vallier, B.W.	Au	Assess	DD (1) 100'	1986	
Guibord	42A/08	Armco Mineral Expl. Ltd. "Main Group Property"	Au	Assess	DD (1) 751'	1985	
Guibord Michaud	42A/08 42A/09	Asarco Expl. Co Ltd. "Perry Lake Claim Group"	Au	Assess	OVD (37) 1,879'	1985	2.8621
Guibord Michaud	42A/08	Falconbridge Ltd. "Dunmar Property"	Au	OMEP	Mag	1985	
Guibord	42A/08	Falconbridge Ltd. "Garrison Creek Project"	Au	OMEP OMEP	IP Mag GL DD (5) 3,921'	1985 1985	
Guibord Michaud	42A/08	Falconbridge Ltd. "Garrison Creek Proj."	Au	Assess	DD (7) 3,008' SA	1985	
Guibord	42A/08	Golden Shield Res. Ltd.	Au	Assess	DD (5) 2,671' Mag HLEM IP	1986 1986	 2.8978
Guibord	42A/08	Kerr Addison Mines Ltd.	Au	Assess	DD (3) 1,510 SA	1986	

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Guibord	42A/08	Neal, N.E.	Au	Assess	DD (1) 680'	1985	
					Mag	1986	2.8808
					GL VLF-EM	1986	2.8943
Guibord	42A/08	Noranda Expl. Co. Ltd. "Guibord 1-84"	Au	Assess	HLEM Mag VLF-EM	1986	2.9341
Guibord	42A/08	Parsons, G.E.	Au	OMEP	Mag	1983	63.4279
Guibord	42A/08	Noranda Expl. Co. Ltd. "Guibord 1-84"	Au	Assess	GL Gc HLEM	1986	2.8884
Guibord	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP		
Guibord	32D/09	Skjonsby, K.E.	Au	D	STr	1964	
Halliday Hutt	41P/14	Kidd Creek Mines Ltd. "Halliday 62-63"	Au,BM	Assess	GL	1986	2.9408
					Mag VLF-EM HLEM	1986	2.9438
Harker Holloway	32D/05	American Barrick Res. Inc. "West Block"	Au	Assess	DD (1) 840'	1986	
					Mag VLF-EM	1985	2.9055
Harker	32D/05	Argentex Res. Expl. Corp.	Au	Assess	STr	1985	
Harker	32D/05	Harley, H. "Harley 2 Claims"	Au	Assess	DD (3) 1,302'	1986	
					SA	1986	2.9303
Harker	32D/05	Hurd, D.F.	Au	Assess	DD (1) 245'	1985	
Harker	32D/05	Johns-Manville Canada Inc. "Harker Lake West Group"	Au	Assess	DD (5) 569'	1985	
Harker	32D/05 32D/12	Jonpol Expl. Ltd.	Au	Assess	VLF-EM	1986	2.9400
Harker	32D/05	Lenora Expl. Ltd. "Harley Option"	Au	Assess	DD (5) 1,847'	1985	
Harker	32D/05	Manville Canada Inc. "Harker Lake West Group"	Au	Assess	GL	1985	2.8787
Harker	32D/05	Perrex Res. Inc. "Ghost Lake Area"	SEE	UNDER	ELLIOTT TOWNSHIP		
Harker	32D/05	Perrex Res. Inc. "Ghost River Area"	SEE	UNDER	ELLIOTT TOWNSHIP		
Harker	32D/05	Sherritt Gordon Mines Ltd.	Au	Assess	AMag AEM-VLF	1985	2.8788
Harker Holloway	32D/12	Teddy Bear Valley Mines Ltd.	Au	OMEP	DD (14) 9,608' IP	1985	63.4486
Hearst McElroy	32D/04	Lacasse, L. "Hearst-McElroy Prop."	Au	Assess	Mag VLF-EM	1986	2.9115
					Mag VLF-EM	1986	2.9276
Hearst	32D/04	MacGregor, R.A. "Benson Creek North"	Au	Assess	VLF-EM	1986	2.8849
					Mag	1986	2.9176
Hearst	32D/04	MacGregor, R.A. "Larder Lakeside Property"	Au	Assess	Mag VLF-EM	1986	2.8931
					VLF-EM	1986	2.9382
Hearst	32D/04	Prevec, L.	Au	Assess	GL	1986	2.9214
Hincks Zavitz	42A/03	Alleraton, R. "Alleraton Zavitz Property"	Au	Assess	DD (3) 1,586'	1986	
				D	CS SA	1986	
					SA	1985	2.9407
Hincks	41P/15	Canamax Resources Inc. "Montrose 1"	SEE	UNDER	ARGYLE TOWNSHIP		
Hincks	42A/02	Kiernicki, F.	Au	Assess	rTr	1985	
Hincks	42A/01	Manville Canada Inc. "McGill Group 2"	Au	Assess	Mag GL VLF-EM Rad	1986	2.9366
Hislop	42A/08	Neal, N.E.	Au	Assess	Mag	1986	2.8807
					VLF-EM	1986	2.8942
Hoblitzell	42H/08	Beaverhead Res. Ltd.	Au	Assess	HLEM Mag	1986	2.9296
Hoblitzell Noseworthy	32E/05	Esso Minerals Canada	Au	Assess	ARes AEM	1986	2.8853
					OVDH (51) 3,123'	1986	2.9365

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Hoblitzell Noseworthy	32E/05	Newmont Expl. of Canada Ltd. "Golden Shield Property"	Au	Assess	Mag DD (2) 1,030' STr	1986 1986	2.8930
Hodgetts	41P/06	Ranex Minerals Inc. "North Claim Block"	Au	Assess	OVDH (6) 48'	1985	2.8420
Hodgetts	41P/06	Ranex Minerals Inc. "South Claim Block"	Au	Assess	OVD (8) 473' OVD (7) 108' Mag VLF-EM Mag VLF-EM	1985 1985 1986 1986	2.7938 2.8857 2.9319 2.9320
Holloway	32D/05	Argentex Res. Expl. Corp. Ltd. "Inco Option"	Au	Assess	DD (4) 8,922	1985	
Holloway	32D/05 32D/12	American Barrick Res. Inc. "East Block"	Au	Assess	DD (1) 1,635	1986	
Holloway	32D/05	Camflo Mines Ltd. "East Block"	Au	OMEP OMEP	GL DD (68) 23,083'	1983 1983	63.4797 63.4297
Holloway	32D/05	Camflo Mines Ltd. "West Block"	SEE	UNDER	HARKER TOWNSHIP		
Holloway Tannahill	32D/05	Canamax Res. Inc. "Bastarache-Mathias Option"	Au	OMEP	HLEM Mag	1983	63.4262
Holloway	32D/12	Canamax Res. Inc. "Marriott-1"	SEE	UNDER	FRECHEVILLE TOWNSHIP		
Holloway Tannahill	32D/05	Condaka Metals Corp. "Magusi River Prop."	Au	Assess	DD (12) 6,066'	1986	
Holloway	32D/12	Neal, N.E. "101 Group"	Au	Assess	DD (2) 1,013'	1985	
Holloway	32D/05	Prominent Res. Ltd.	Au	Assess	AMag AEM-VLF	1986	2.8883
Holloway	32D/12	Teddy Bear Valley Mines Ltd.	SEE	UNDER	HARKER TOWNSHIP		
Holmes	42A/01	Chevron Minerals Ltd.	SEE	UNDER	BURT TOWNSHIP		
Holmes	41P/15 41P/16 42A/01	Falconbridge Ltd. "Flavelle-Holmes Group"	SEE	UNDER	CAIRO TOWNSHIP		
Holmes	42A/02	Falconbridge Ltd. "North Grid"	SEE	UNDER	ALMA TOWNSHIP		
Holmes	42A/02	Falconbridge Ltd. "South Grid"	SEE	UNDER	ALMA TOWNSHIP		
Holmes	42A/01 41D/16	Rio Algom Expl. Inc. "Cunningham Option"	SEE	UNDER	FLAVELLE TOWNSHIP		
Hutt	41P/14	Kidd Creek Mines Ltd. "Halliday 62-63"	SEE	UNDER	HALLIDAY TOWNSHIP		
Ingram	31M/13	Agnico-Eagle Mines Ltd.	Au	Assess	GL Mag VLF-EM	1986	2.8846
Ingram	31M/13	Marshall, F.	Au	Assess	DD (5) 1,270'	1985	
Iroquois Point	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	SEE	UNDER	CHESNEY BAY		
Katrine	32D/04	Kiazyk, B.	Au	D Assess	CS SA rTr DD (2) 225'	1985 1986	
Katrine	32D/04	Lac Minerals Ltd. "Grid KA 8"	Au	Assess	Mag	1986	2.9249
Kerrs Warden	42A/09	Dome Expl. (Canada) Ltd. "Project 257"	Au	Assess	DD (2) 2,237'	1985	
Kerrs	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	SEE	UNDER	CHESNEY BAY		
Kerrs	42A/09	Noranda Expl. Co. Ltd. "Kerrs 1-77"	SEE	UNDER	CHESNEY BAY		
Lamplugh	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	SEE	UNDER	CHESNEY BAY		
Lamplugh	32D/12	Seal River Expl. Ltd.	Au	Assess	Mag VLF-EM	1986	2.9374

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Lebel	32D/04	Canadian Nickel Co. Ltd. "Canico-Upper Canada Joint Venture"	Au	Assess	IP	1986	2.9316
Lebel	32D/04	Forbes, C.F. "Sylvanite Tailings"	Au	Assess	OVD (3) 123'	1986	2.9186
Lebel	32D/04	Labine, M.	Au	Assess	VLF-EM	1985	2.8479
Lebel	32D/04	Lampe Res. Co. Ltd.	Au	Assess	STr SA	1986 1986	 2.9345
Lebel	32D/04	Leahy, M. "Heart Lake Prop."	Au	Assess	VLF-EM	1985	2.8750
Lebel	32D/04	Leahy, M. "Leahy-Jimberlana Option"	Au	Assess	Mag VLF-EM	1986	2.9323
Lebel	32D/04	Leahy, M. "Sylvanite Tailings"	Au	Assess	OVD (3) 50'	1986	2.9185
Lebel	32D/04	Premier Explorations "Jimberlana Option"	Au	Assess	Mag VLF-EM SA	1986	2.9322
Lebel	32D/04	Premier Expl. "Sylvanite Tailings"	Au	Assess	OVD (4) 115'	1986	2.9184
Lebel	32D/04	Tamminen, T.	Au	Assess	rTr	1985	
Lee Maisonville	42A/01	Falconbridge Ltd. "Maisonville Tp. Project"	Au	Assess	Mag VLF-EM GL SA SA Mag VLF-EM GL	1986 1985 1985 1986 1986	2.8991 2.9234 2.9233 2.9283 2.9381
Lee	42A/01	Glen Auden Res. Ltd. "Grenfell Prop."	SEE	UNDER	BOMPAS TOWNSHIP		
Maisonville	42A/01	Falconbridge Ltd. "Maisonville Tp. Project"	SEE	UNDER	LEE TOWNSHIP		
Maisonville	42A/01	Glen Auden Res. Ltd. "Grenfell Prop."	SEE	UNDER	BOMPAS TOWNSHIP		
Maisonville	42A/01	Leahy, M.	Au	Assess	DD (2) 758'	1986	
Maisonville	42A/01	Longbow Lake Expl. Syndicate	SEE	UNDER	BERNHARDT TOWNSHIP		
Maisonville	42A/01	Noranda Expl. Co. Ltd. "Maisonville 1-82"	Au	Assess	IP	1985	2.8937
Maisonville	42A/08	Noranda Expl. Co. Ltd. "Pryme Energy Option"	Au	Assess	HLEM GL	1985 1985	2.8824 2.8671
Marriott Stoughton	32D/12	Canamax Res. Inc. "Dalhousie Oil & Gas Option"	Au	OMEP	HLEM Mag GL	1983	63.4262
Marriott	32D/12	Canamax Res. Inc. "Marriott-1"	SEE	UNDER	FRECHEVILLE TOWNSHIP		
Marriott Stoughton	32D/12	Canamax Res. Inc. "Marriott-2"	Au	OMEP	HLEM Mag GL	1983	63.4262
Marriott	32D/05 32D/12	Neal, H.E.	Au	Assess	Mag VLF-EM	1986 1986	2.9084 2.9517
Marshay	41P/03	Ranex Minerals Inc.	Au	Assess	OVD (16) 222' OVD (9) 224' Mag VLF-EM	1985 1985 1986	2.8611 2.8743 2.9409
McCann	42A/08	Hyde, D.	Au	Assess	DD (2) 207'	1986	
McCool	42A/09	Noranda Expl. Co. Ltd.	Au	Assess	Mag GL STr	1985	2.8887
McCool Milligan Munro Rayner Lake	42A/09	Yellow Sands Prosp. Syndicate	Au	Assess	SA GS	1985	2.9187
McElroy	32D/04	Bastarache, G.	Au	Assess	DD (1) 207'	1986	
McElroy	32D/04	Bishop, J.	SEE	UNDER	BOSTON TOWNSHIP		
McElroy	32D/04	French, G.B.	Au	Assess	STr	1986	

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
McElroy	32D/04	Golden Shield Res. Ltd. "Cathroy-Larder Gold Prop."	Au	Assess	Mag VLF-EM	1986	2.9342
McElroy	31M/13 32D/04	Golden Shield Res. Ltd. "Cathroy Larder Gold Property"	SEE	UNDER	CATHARINE TOWNSHIP		
McElroy	32D/04	Lacasse, L. "Hearst-McElroy Prop"	SEE	UNDER	HEARST TOWNSHIP		
McElroy	32D/04	MacGregor, R.A. "Moly Hill Prop."	Au	Assess	SA	1985	2.8748
McElroy	32D/04	Shenandoah Res. Ltd.	Au	Assess	STr	1986	
McElroy	32D/04	Yost, C.A. & R.	Au	Assess	rTr rTr STr	1985 1986	
McGarry	32D/04	Barnard, R.	Au	Assess	STr	1985	
McGarry	32D/04	Boudreault, B.: Spadetto, G.	Au	Assess	STr rTr	1986	
McGarry	32D/04	Leahy, M. "McGarry West Grp."	Au	Assess	VLF-EM	1985	2.8583
McGarry	32D/04	MacGregor, R.A. "Claim L 579585"	Au	Assess	GL	1986	2.9205
McGarry	32D/04	Premier Expl. Inc.	Au	Assess	AEM-VLF AMag	1986	2.9033
McGarry	32D/04	Queenston Gold Mines Ltd. "Kosy Project"	Au	Assess	Mag	1986	2.9183
McNeil	42A/02	Argyle Ventures Inc. "McNeil Property"	Au	Assess	DD (9) 1,228 CS	1986	
McNeil	42A/02	Fairland Res. Inc.	Au	Assess	Mag GL VLF-EM	1985	2.8622
McNeil	42A/02	King, M.; Weekley, L.	Au	Assess	STr STr rTr	1985 1986	
McNeil	42A/02	Konovsky, P.R.	Au	Assess	DD (2) 360'	1986	
McNeil	42A/02	Manville Canada Inc. "Bobjo Group"	Au	Assess	DD (3) 295' GL	1985 1986	2.8925
McVittie	32D/04	Lac Minerals Ltd. "McVittie Property"	Au	Assess	DD (5) 2,825	1985	
McVittie	32D/04	Lenora Expl. Ltd.	Au	OMEP OMEP	DD (87) 23,772 Mag STr SA	1984 1983	
McVittie	32D/04	MacGregor, R.A. "Misema River Group"	SEE	UNDER	GAUTHIER TOWNSHIP		
McVittie	32D/04	MacGregor, R.A. "Station Townsite"	Au	Assess	Gc VLF-EM GL SA Mag	1985 1985 1986	2.8581 2.8850 2.8699
Melba	42A/08	Lac Minerals Ltd. "Grid ME 3"	Au	Assess	Mag	1986	2.9239
Melba	42A/08	Lac Minerals Ltd. "Grid ME 4"	Au	Assess	Mag	1986	2.9240
Melba	42A/08	Lac Minerals Ltd. "Grid ME 27"	SEE	UNDER	BENOIT TOWNSHIP		
Melba	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP		
Michaud	42A/08 42A/09	Asarco Expl. Co. Ltd. "Perry Lake Claim Group"	SEE	UNDER	GUIBORD TOWNSHIP		
Michaud	42A/09	Bieniae, D.; Bosum, J.; Meunier, D.	Au	Assess	GL	1985	2.8470
Michaud	42A/08	Falconbridge Ltd. "Dunmar Property"	SEE	GUIBORD TOWNSHIP			
Michaud	42A/08	Falconbridge Ltd. "Garrison Creek Proj."	SEE	UNDER	GUIBORD TOWNSHIP		
Michaud	42A/08	Falconbridge Ltd. "Garrison Creek Proj." "PM-620"	Au	OMEP OMEP	DD (22) 18,825' IP Mag rTr SA	1985 1985	

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Nicol	41P/10	The Big Four	Ag	D	rTr	1962	
				D	rTr	1964	
Northeast Bay	32D/13	Utah Mines Ltd. "Lake Abitibi Gold Property"	SEE	UNDER	BONIS TOWNSHIP		
Noseworthy	32E/05	Esso Minerals Canada	SEE	UNDER	HOBLITZELL TOWNSHIP		
Noseworthy	32E/05	Newmont Expl. Co. of Canada Ltd. "Golden Shield Property"	SEE	UNDER	HOBLITZELL TOWNSHIP		
Noseworthy	32E/05 32E/12	Newmont Expl. of Canada Ltd. "Mikwam Property"	SEE	UNDER	BRADETTE TOWNSHIP		
Noseworthy	32E/05 32E/12	Noranda Expl. Co. Ltd. "Bradette 1-82"	SEE	UNDER	BRADETTE TOWNSHIP		
Otto	42A/01	Allsopp, A; Croxall, J. & E.	Au	Assess	DD (1) 145'	1985	
					STr rTr	1985	
Otto	42A/01	Birnie, B.	Au	Assess	STr	1985	
					STr	1986	
Otto	42A/01	Lenora Expl. Ltd.	SEE	UNDER	EBY TOWNSHIP		
Pacaud	31D/13	Boston Creek Gold Mines Ltd.	Au	Assess	rTr	1985	
					STr	1986	
Pacaud	31M/13	Hurd, D.F.	Au	Assess	rTr	1985	
Pacaud	31M/13	Perron, A.H. "Barry Hollinger Prop.	SEE	UNDER	BOSTON TOWNSHIP		
Pacaud	31M/13	Teck Expl. Ltd. "Block 1"	Au	Assess	Mag VLF-EM	1986	2.9146
Playfair	42A/08	Standen, Lloyd	Au	Assess	STr	1986	
Powell	41P/15	Hill, A.F. "Peters' Option"	Au	OMEP	GL	1984	63.4292
Rand	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	SEE	UNDER	CHESNEY BAY		
Rayner Lake	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	SEE	UNDER	CHESNEY BAY		
Rand	32D/12	Rocky Mines Ltd.	Au	Assess	HLEM Mag	1985	2.8955
Rayner Lake	42A/09 42A/16	Bay Res. & Serv. Inc. "Crossley, J.D.; Geisler, C.M. Claims"	SEE	UNDER	MILLIGAN TOWNHIP		
Rayner Lake	42A/09	Noranda Expl. Co. Ltd. "Kerrs 1-77"	SEE	UNDER	CHESNEY BAY		
Rayner Lake	42A/09	Ryan, W.J.	SEE	UNDER	MILLIGAN TOWNSHIP		
Rayner Lake	42A/09	Yellow Sands Prosp. Synd.	SEE	UNDER	McCOOL TOWNSHIP		
Skead	31M/13	Cominco Ltd. "Cathroy-Perron Prop."	SEE	UNDER	CATHARINE TOWNSHIP		
Skead	31M/13	Crighton, J.D.	Au	Assess	STr SA	1985	
					DD (1) 303'	1986	2.8856
				D	CS	1986	
					SA	1986	2.9028
					DD (1) 162' CS	1986	
					STr	1986	
Sothman	41P/14	Manville Canada Inc.	Au	Assess	Mag VLF-EM Rad GL	1986	2.9026
Steele	32D/13	Utah Mines Ltd. "Lake Abitibi Gold Property"	SEE	UNDER	BONIS TOWNSHIP		
Stoughton	32D/12	Accord Resources Inc.	SEE	UNDER	FRECHEVILLE TOWNSHIP		
Stoughton	32D/12	Canamax Res. Inc. "Dalhousie Oil & Gas Option"	SEE	UNDER	MARRIOTT TOWNSHIP		
Stoughton	32D/12	Canamax Res. Inc. "Marriott-1"	SEE	UNDER	FRECHEVILLE TOWNSHIP		

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Michaud	42A/08	Falconbridge Ltd. "Thibault Claims"	Au	Assess	DD (3) 1,767'	1985	
					IP SA	1985	2.8939
Michaud	42A/09	Golden Range Res. Inc.	Au	Assess	DD (2) 931'	1986	
					GL	1986	2.9435
Michaud	32D/05	Kidd Creek Mines Ltd. "Michaud 44"	Au	Assess	Mag VLF-EM HLEM	1986	2.9032
Michaud	42A/08	Lacana Mining Corp. "Goldfield Option"	Au	Assess	DD (2) 1,357'	1986	
Michaud	42A/08	Nahanni Mines Ltd. "West Property"	Au	OMEP	DD (1) 400'	1983	63.4313
Michaud	42A/08	Nahanni Mines Ltd. "Oct. & Sept. Grid"	SEE	UNDER	GARRISON TOWNSHIP		
Michaud	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP		
Mickle	41P/09	Cameron, J.A.	Ag	D	rTr	1960	
				D	rTr	1961	
Mickle	41P/09	Silver Lake Res. Inc.	Ag	OMEP	DD (17) 3820'	1983	63.4271
Midlothian	41P/14	Regal Goldfields Ltd.	Au	OMEP	Mag SA	1983	63.4281
Milligan Rayner Lake Warden	42A/09 42A/16	Bay Resources & Serv. Inc. "Crossley, J.D.; Geisler, C.M. Claims"	Au	Assess	Mag Mag	1986 1986	2.8847 2.9179
Milligan	32D/12 42A/16	Kerr Addison Mines Ltd. "Abitibi Proj."	SEE	UNDER	CHESNEY BAY		
Milligan Rayner Lake	42A/09	Ryan, W.J.	Au	Assess	rTr	1985	
Milligan	42A/09	Yellow Sands Prosp. Synd.	SEE	UNDER	McCOOL TOWNSHIP		
Milner	41P/10	Manridge Expl. Ltd.	Ag	OMEP	Gc VLF-EM	1984	63.4317
				OMEP	DD (20) 3,976' SA	1983	
Montrose	41P/15	Canamax Resources Inc. "Montrose 1"	SEE	UNDER	ARGYLE TOWNSHIP		
Morrisette	32D/04	Kinbauri Gold Corp. "Alfie Creek Prop."	Au	Assess	DD (2) 1,174'	1985	
Morrisette	32D/05	Kinbauri Gold Corp. "Lahaie Claim Group"	Au	Assess	VLF-EM Mag	1986	2.9057
					IP	1985	
Morrisette	32D/04	Kinbauri Gold Corp. "Morrisette Claim Group"	Au	Assess	IP	1986	2.9059
					Gc	1986	2.9090
					Mag VLF-EM	1986	2.9000
					DD (6) 1,992'	1986	
Morrisette	32D/04	Lac Minerals Ltd. "Grid M 17"	Au	Assess	DD (1) 627'	1985	
Morrisette	32D/04	Lac Minerals Ltd. "Grid M 21"	Au	Assess	DD (1) 557'	1985	
Morrisette	32D/04	Link, T.	Au	Assess	DD (3) 790'	1986	
Morrisette	42A/01	O'Connor, F.T.	SEE	UNDER	BERNHARDT TOWNSHIP		
Mortimer	42A/15	St. Denis, R.	Au	Assess	rTr	1985	
					rTr, STr	1986	
Munro	42A/09	Bruneau Mining Corp.	Au	Assess	DD (2) 1,860'	1986	
Munro	42A/09	Canamax Res. Inc.	Au	Assess	DD (4) 3,660'	1986	
Munro	42A/09	Lalonde, D.	Au	Assess	rTr	1985	
Munro	42A/09	Mullan, G.	Au	Assess	AMag AEM-VLF	1985	2.8855
Munro	42A/09	Perron, A.N. "Perron-Pollock Project"	Au	Assess	AMag AEM-VLF	1985	2.8882
Munro	42A/09	Yellow Sands Prosp. Synd.	SEE	UNDER	McCOOL TOWNSHIP		
Newman	32E/08	Core Energy Corp.	SEE	UNDER	BLAKELOCK TOWNSHIP		
Newman	42H/08	Leo Alarie & Sons Ltd.	Au	Assess	Mag HLEM	1986	2.9547

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Stoughton	32D/12	Canamax Res. Inc. "Marriott-2"	SEE	UNDER	MARRIOTT TOWNSHIP		
Stoughton	32D/12	Edda Res. Inc.	SEE	UNDER	FRECHEVILLE TOWNSHIP		
Stoughton	32D/12	Pamour Porcupine Mines Ltd.	Au	Assess	Mag	1986	2.9089
Sulphur Island	32D/12	McKinnon, D. (et al) "Shaft Island Area"	Au	Assess	AMag AEM-VLF	1986	2.8918
Tannahill	32D/05	Canamax Res. Inc. "Bastarache-Mathias Option"	SEE	UNDER	HOLLOWAY TOWNSHIP		
Tannahill	32D/05	Condaka Metals Corp. "Magusi River Prop."	SEE	UNDER	HOLLOWAY TOWNSHIP		
Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 2"	Au	Assess	Mag	1986	2.9246
Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 4"	Au	Assess	Mag	1986	2.9252
Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 6"	Au	Assess	Mag	1986	2.9248
Tannahill	32D/05	Lac Minerals Ltd. "Grid TA 7"	Au	Assess	Mag	1986	2.9257
Tanahill	32D/05	Lac Minerals Ltd. "Grid TA 8"	SEE	UNDER	BEN NEVIS TOWNSHIP		
Tannahill	32D/05	Mathias, I.	Au	Assess	STr	1985	
Teck	42A/01	Flint Rock Mines Ltd.	SEE	UNDER	GRENFELL TOWNSHIP		
Teck	42A/01	Goldhunter Expl. Inc.	Au	Assess	STr rTr GL	1986 1986	 2.9439
Teck	42A/01	Lac Minerals Ltd. "Claim L 842970"	Au	Assess	Mag	1986	2.9134
Teck	42A/01	Lac Minerals Ltd. "Condie Claims"	Au	Assess	DD (1) 200'	1986	
Teck	42A/01	Newfields Minerals Ltd.	Au	Assess	DD (1) 3,521'	1986	
Teck	42A/01	O'Connor, F.T.	SEE	UNDER	BERNHARDT TOWNSHIP		
Teck	42A/01	Perron, A.H. "Group 1 & 2"	Au	Assess	Gc VLF-EM Mag STr	1985 1985 1986 1986	2.8683 2.8717 2.9041
Teck	42A/01	Perron, A.H. "Lois Lake Group"	Au	Assess	GL STr	1986 1986	2.9166
Teck	42A/01	Rio Algom Expl. Inc. "Wyment-Kidston Option"	Au	Assess	DD (2) 1,230'	1985	
Thackeray	32D/05	Kerr Addison Mines Ltd. "Kerr-Garrison Property"	SEE	UNDER	GARRISON TOWNSHIP		
Thackeray	32D/05	Perrex Res. Inc. "Ghost River Area"	SEE	UNDER	ELLIOTT TOWNSHIP		
Tudhope	41P/09	Berdux, J.C.	Au	Assess	rTr STr	1962	
Tweed	42H/08	Glen Auden Res. Ltd.	Au	Assess	AEM-VLF AMag	1985	2.8772
Tweed	42H/08	Glen Auden Res. Ltd.	SEE	UNDER	BRAGG TOWNSHIP		
Walker	42A/10	Canamax Res. Inc. "Walker 6"	Au	Assess	DD (1) 758'	1986	
Walker	42A/02	Golden Grail Mineral Expl. Corp.	Au	Assess	OVD (11) 718'	1985	2.8659
Walker Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 22"	Au	Assess	GL DD (4) 5,903'	1985 1986	2.8620
Warden	42A/09 42A/16	Bay Res. & Serv. Inc. "Crossley, J.D.; Geisler, C.M. Claims"	SEE	UNDER	MILLIGAN TOWNSHIP		
Warden	42A/09	Dome Expl. (Canada) Ltd.	Au	Assess	DD (1) 925'	1985	

TABLE 7.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Warden	42A/09	Dome Expl. (Canada) Ltd. "Project 257"	SEE	UNDER	KERRS TOWNSHIP		
Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 22"	SEE	UNDER	WALKER TOWNSHIP		
Wilkie	42A/09	Kidd Creek Mines Ltd. "Wilkie 26"	Au	Assess	DD (1) 1,002'	1986	
Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 31"	Au	Assess	GL DD (2) 2,161	1985 1986	2.8740
Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Wilkie-Carr Group"	SEE	UNDER	CARR TOWNSHIP		
Zavitz	42A/03	Allerston, R. "Allerston Zavitz Property"	SEE	UNDER	HINCKS TOWNSHIP		

Table 7.3, page 14

In 1986, approximately 22 573 m of drill core were collected, catalogued and stored. Figure 7.2 shows the location of the drillholes from which the core has been stored in the library. Table 7.4 lists a summary of core stored for each township, by company. Response to the Core Library Program has been encouraging with an increase in the number of users each year. There has been a total of 408 users and inquiries from January 1 to December 1, 1986.

The capacity of the Library has been exceeded. Some core has been moved to an outside storage site. In general, for areas of high concentration of drilling, one out of three or four holes' core is in the library and the others are stored on pallets at an outside location.

Assistance at the Core Library was provided by F. Kiernicki, Geological Assistant; L. Poirier, Mining Sector Works Program; and B. Manion and G. Santia (each working part-time), Futures Program.

The Core Library is located west of Kirkland Lake, on the southern side of Highway 66, at the Ontario Ministry of Natural Resources District Office. Persons wishing to examine or donate core should telephone (705) 642-3222 Ext. 169, or write to:

Drill Core Library
Ontario Ministry of Northern Development and Mines
P.O. Box 129
Swastika, Ontario
P0K 1T0

OPERATION BLACK–RIVER MATHESON (BRIM)

INTRODUCTION

Operation Black River-Matheson (BRIM) is an integrated, multidisciplinary program focused on 40 townships extending from Night Hawk Lake eastward to the Ontario-Quebec interprovincial boundary (Figure 7.3). Funded equally by the Ontario Ministry of Northern Development and Mines and the Ontario Ministry of Natural Resources, the program has been designed to stimulate the economy of northern Ontario in the long term via mineral exploration incentives. These incentives are provided through the development of a comprehensive exploration database which, ideally, will contribute to the discovery of mines. The goals of the five-year program (now in its fourth year) will be realized through contributions from the Geophysics/Geochemistry, Precambrian Geology, Mineral Deposits, and Engineering and Terrain Geology Sections of the Ontario Geological Survey, and the Kirkland Lake and Timmins Resident Geologist Offices.

ONGOING ACTIVITIES

During the 1986 field season, geologists with the Precambrian Geology Section of the Ontario Geological Survey continued to map the bedrock geology of the BRIM area. Mapping was concentrated in the Coulson-Warden-Milligan Township area. The results of this mapping have been released as an Open File Map and a Miscellaneous Paper (Johnstone 1986a, 1986b). Preliminary series bedrock geological maps (scale 1:15 840) for the townships of Beatty, Munro, and possibly McCool, are expected to be released early in 1987.

Geologists with the Geophysics/Geochemistry and Engineering and Terrain Geology Sections of the Ontario Geological Survey continued overburden rotasonic drilling, backhoe trenching, and hand sampling programs during 1986. These were concentrated in the central and eastern parts of the BRIM area (Steele *et al.* 1986). Many of the BRIM publications released during 1986 and early 1987 (Table 7.5) focused on aspects of the backhoe and rota-sonic overburden drilling work performed during the 1984 and 1985 field seasons. Field work planned for 1987 includes winter rota-sonic overburden drilling concentrated in the western 24 BRIM townships. A map with bedrock data derived from this program will be produced in the autumn and, if warranted, a gold grain distribution map similar to previous releases may also be published in early summer. A modest program of backhoe and hand sampling of till along the shore of Lake Abitibi is also planned for the summer field season. Early in 1987, an Ontario Geological Survey Open File Report is scheduled for release which will describe the analytical techniques employed for, and will include a discussion of, the geochemical data gained from the 1984 and 1985 rota-sonic overburden drilling, backhoe, and hand sampling programs. The report will include previously unpublished data,

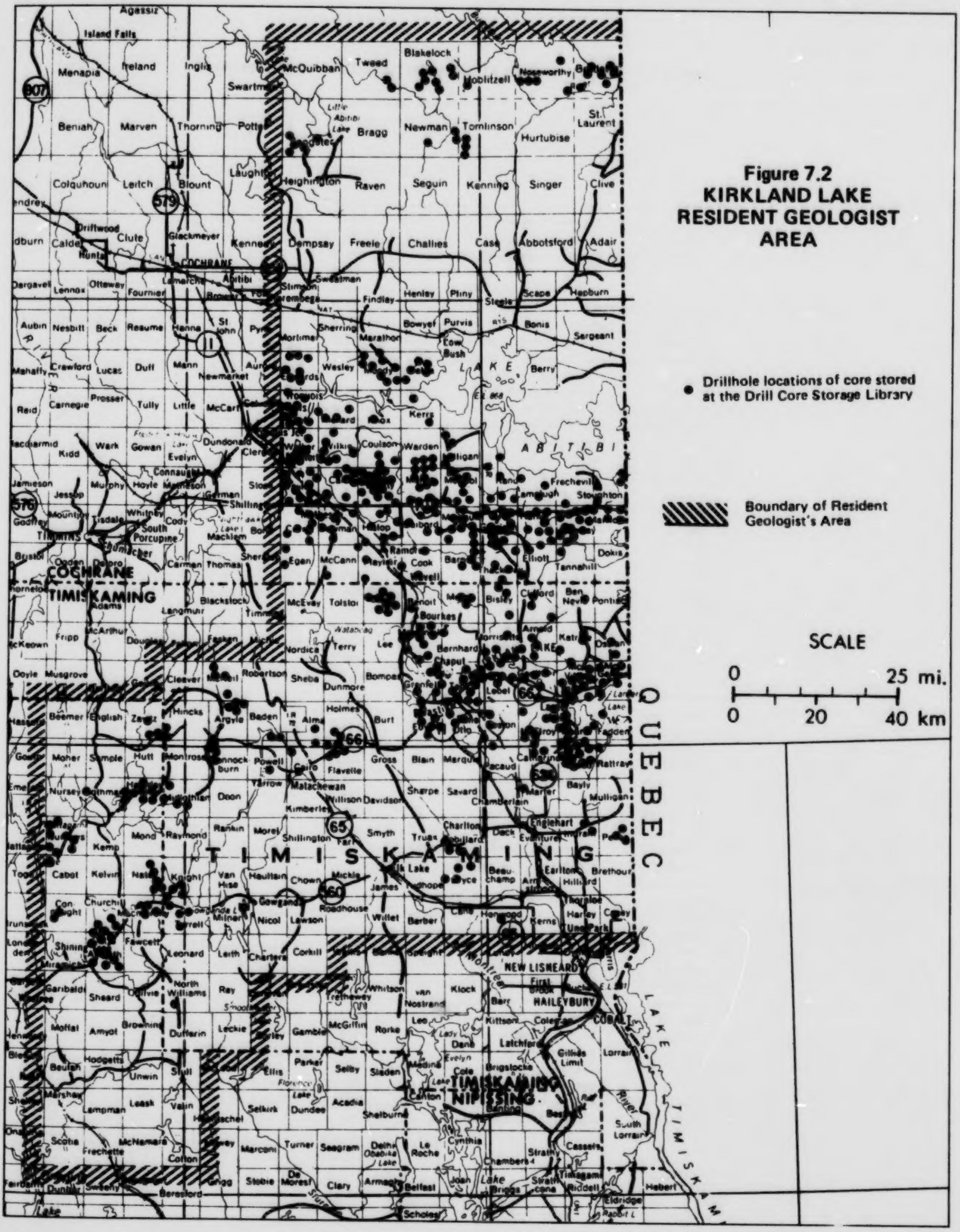

Figure 7.2
KIRKLAND LAKE
RESIDENT GEOLOGIST
AREA

● Drillhole locations of core stored at the Drill Core Storage Library
Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
QUEBEC
COCHRANE
TIMISKAMING
TIMMINS
HAILEYBURY
NEW LISKEARD
COBALT
LAKE ABITIBI
LAKE TIMISKAMING
TIMISKAMING NIPISSING
11
66
65
560
579
576
807
Agassiz
Island Falls
Menapia
Ireland
Inglis
McQuibban
Tweed
Blakelock
Noseworthy
St. Laurent
Benoit
Bourkes
Marven
Thorning
Bragg
Newman
Tomlinson
Hurtubise
Colquhoun
Leitch
Blount
Raven
Seguin
Kenning
Singer
Clive
Clute
Kennedy
Dempsay
Freele
Challies
Case
Abbotsford
Adair
Lamarche
Abitibi
Findlay
Henley
Pliny
Steele
Scapa
Hepburn
Aubin
Nesbitt
Beck
Reaume
Henna
Mortimer
Sherring
Bowyer
Purvis
Bonis
Sergeant
Crawford
Lucas
Duff
Mann
Newmarket
Wesley
Berry
Carnegie
Prosser
Tully
Little
Kerrs
Kidd
Wark
Gowan
Evelyn
Dundonald
Warden
Coulson
Jamieson
Jessop
Murphy
Hoyle
Frecheville
Stoughton
Godfrey
Tisdale
Whitney
Cody
South Porcupine
Macklem
Ramore
Cook
Elliott
Tannahill
Dokis
Ogden
Deloro
Carman
Thomas
Egen
McCann
McEvay
Tolstoi
Bisley
Clifford
Ben Nevis
Pontiac
Blackstock
Langmuir
Fripp
McArthur
Douglas
Nordica
Terry
Lee
Bernhardt
Chaput
Musgrove
Cleaver
Robertson
Sheba
Dunmore
Bompas
Lebel
Larder Lake
Fadden
Beemer
English
Zavitz
Hincks
Argyle
Baden
Alma
Holmes
Burt
Moher
Semple
Hutt
Montrose
Powell
Cairo
Flavelle
Gross
Blain
Marquis
Pacaud
Rattray
Nursey
Matachewan
Yarrow
Doon
Willison
Davidson
Sharpe
Savard
Chamberlain
Bayly
Mulligan
Kimberley
Rankin
Morel
Shillington
Smyth
Truax
Charlton
Dack
Englehart
Evanturel
Kemp
Mond
Raymond
Cabot
Kelvin
Knight
Van Hise
Haultain
Chown
Mickle
James
Beauchamp
Earlton
Brethour
Hilliard
Churchill
Milner
Nicol
Lawson
Gowganda
Roadhouse
Willet
Barber
Kerns
Harley
Casey
Fawcett
Leonard
Leith
Charters
Corkill
Garibaldi
Sheard
North Williams
Ray
Tretheway
Whitson
Van Nostrand
Klock
Barr
Moffat
Amyot
Browning
Dufferin
Leckie
Gamble
McGiffin
Rorke
Lea
Dane
Kittson
Coleman
Lorrain
Hodgetts
Beulah
Unwin
Stull
Ellis
Parker
Selby
Sladen
Medina
Cole
Brigstocke
Gillies Limit
Marshay
Lampman
Leask
Valin
Selkirk
Dundee
Acadia
Shelburne
Banting
Scotia
Frechette
McNamara
Cotton
Turner
Seagram
Delhi
Le Roche
Cynthia
Strathy
Cassels
South Lorrain
Chambers
Fairbairn
Dunbar
Sweeny
Beresford
Grigg
Stobie
De Morest
Clary
Armagh
Belfast
Joan
Briggs
Strathcona
Riddell
Temagami
Hebert
Eldridge
Scholes

TABLE 7.4 CORE STORED AT KIRKLAND LAKE DRILL CORE LIBRARY

Township	Company	Drill Hole Length (m)	Core Stored Inside (m)	Core Stored Outside (m)
Abitibi I.R.70	Ont. Geol. Survey	120.4	28.0	19.5
Alma	Minorex Limited	326.5	295.0	0.0
Alma	Northclaim Resources	93.6	1.6	0.0
Argyle	Mid-North Engineer Ser. Ltd.	640.5	7.1	0.0
Argyle	MPH Consulting L	88.1	78.3	0.0
Argyle	New Kelore Mines Ltd.	320.1	4.0	0.0
Arnold	Merrick, A., Link, T.	1864.7	1649.1	46.6
Asquith	Annett, R.	73.2	61.0	0.0
Asquith	Patino Mines Limited	75.9	75.3	0.0
Asquith	Southgate Resources	180.6	2.5	0.0
Asquith	Timmins Gold Resources	886.1	758.9	0.0
Baden	Hansen Mineral Expl.	105.7	92.0	0.0
Bannockburn	Hanna Mining Company	93.4	74.1	0.0
Bannockburn	MPH Consulting Ltd.	254.2	232.3	0.0
Bannockburn	Quevillon, G.	180.3	4.2	0.0
Barnet	Dominion Gulf C	1233.9	2.8	0.0
Barnet	Noranda Exploration Co. Ltd.	135.3	132.9	0.0
Beatty	Amax Minerals Exploration	145.9	141.8	0.0
Beatty	Argyll Gold Mines	1093.5	1.4	0.0
Beatty	Clodan Gold Mines	157.3	0.8	0.0
Beatty	Gulf Minerals Canada Limited	1039.6	930.8	0.0
Beatty	Maude Lake Gold Mines Ltd.	1239.1	26.5	0.0
Beatty	Noranda Exploration Co. Ltd.	399.2	191.7	0.0
Beatty	Ontario Geological Survey	206.6	50.9	40.1
Ben Nevis	Beaudry, R.	408.4	261.5	0.0
Ben Nevis	Kiasyk, Ben	34.4	34.4	0.0
Benoit	Goliath Mines Ltd.	645.6	627.6	0.0
Bernhardt	Beaumont Consolidated	871.7	129.7	0.0
Bisley	Monopros Ltd.	389.2	288.6	0.0
Bisley	Ontario Geological Survey	7.2	2.0	0.0
Black	Card Lake Copper Mines Ltd.	2196.3	907.9	907.9
Black	Goliath Mines Ltd.	502.1	454.7	0.0
Black	McKinnon, D.	2164.9	835.8	1155.9
Blakelock	Noranda Exploration Co. Ltd.	401.5	293.7	0.0
Blakelock	Utah Mines Limited	269.7	157.2	0.0
Boston	Canadian Nickel Co. Ltd.	498.3	485.4	0.0
Boston	Dominion Foundaries	97.5	95.1	0.0
Boston	Kerr Addison Mines Limited	167.6	1.6	0.0
Bowman	Asarco Exploration Company	713.7	532.1	0.0
Bowman	Ontario Geological Survey	95.5	23.1	10.4
Bowman	Prospection Ltd.	118.3	116.4	0.0
Bradette	Newmont Exploration Canada Ltd.	2448.5	1741.3	0.0
Bradette	Noranda Exploration Co. Ltd.	533.9	320.2	0.0
Bryce	Anaconda Canada Exploration	913.8	877.0	0.0
Bryce	Bush, C.	232.5	229.8	0.0
Burrows	Hanna Mining Company	138.4	92.0	0.0
Burrows	Hollinger Mines L	312.3	35.4	0.0
Burrows	Hollinger Mines L	152.1	9.8	0.0
Burrows	Newmont Exploration Canada Ltd.	1614.9	1545.4	0.0
Cabot	Hanna Mining Company	212.4	131.1	0.0
Cairo	Minorex Limited	598.0	553.9	0.0
Carr	Cominco L	396.0	352.7	0.0
Carr	Ontario Geological Survey	281.5	44.3	17.4
Casey	Pronto Exploration	232.0	205.1	0.0

TABLE 7.4 Continued

Catharine	Amax Minerals Exploration	8228.4	830.0	6754.0
Catharine	Link, W.O.	302.7	263.7	0.0
Churchill	Patino Mines Limited	117.0	116.1	0.0
Churchill	Shiningtree Gold Res. Inc.	1005.3	966.3	0.0
Churchill	Timmins Gold Resources	346.6	304.5	0.0
Cleaver	Teck Exploration Limited	323.4	4.0	0.0
Clifford	Merrick, A., Link, T.	462.4	418.7	0.0
Clifford	Noranda Exploration Co. Ltd.	227.9	1.8	0.0
Connaught	Patino Mines Limited	515.4	488.4	0.0
Cook	New Kelore Mines Limited	172.6	81.6	0.0
Cook	Noranda Exploration Co. Ltd.	146.0	104.5	0.0
Cook	Ontario Geological Survey	21.3	4.9	12.8
Coulson	Canamax Resources Inc.	207.0	166.3	0.0
Coulson	Labrador Exploration Ltd.	325.0	278.6	0.0
Currie	Asarco Exploration Company	3971.2	1035.5	1862.7
Currie	Ontario Geological Survey	165.5	94.1	18.4
Currie	Turney, W.J.	39.0	0.2	0.0
Eby	Harrington, P.	67.1	0.6	0.0
Eby	Mary Ellen Resources	1223.2	1105.3	0.0
Eby	Noranda Exploration Co. Ltd.	45.1	39.6	0.0
Eby	Reed, J.D.	360.0	342.4	0.0
Eby	Rivard, F.	275.5	272.8	0.0
Edwards	Amax Minerals Exploration	321.3	231.3	0.0
Edwards	Canadian Javelin	61.0	1.1	0.0
Edwards	Canadian Javelin L	549.9	7.6	0.0
Edwards	Canamax Resources Incorporated	510.0	243.1	0.0
Egan	Ontario Geological Survey	51.2	26.7	0.0
Elliott	Lenora Explorations Ltd.	270.0	267.3	0.0
Elliott	Ontario Geological Survey	50.9	20.4	10.4
Flavelle	Minorex Limited	91.4	75.3	0.0
Flavelle	Riocanex I	521.4	509.6	0.0
Galna	Mistango River Mines	1525.2	4.1	0.0
Galna	Utah Mines Ltd.	662.0	577.3	0.0
Garrison	Amax Minerals Exploration	729.0	568.0	0.0
Garrison	Canamax Resources Inc.	305.8	224.2	0.0
Garrison	Jonpol Expl. L.	809.9	538.0	0.0
Garrison	Kerr Addison Mines Ltd.	1573.7	1541.2	0.0
Garrison	Noranda Exploration Co. Ltd.	360.0	266.1	0.0
Garrison	Ontario Geological Survey	257.9	8.8	100.4
Gauthier	Forbes, C., Leahy, M.	55.2	21.0	0.0
Gauthier	Haas-Warner Mining Limited	239.3	236.2	0.0
Gauthier	Hill, R.	152.7	148.1	0.0
Gauthier	Hoffman Expl. and Minerals Ltd.	639.9	562.7	0.0
Gauthier	Leahy, M., Forbes, C.	31.7	0.4	0.0
Grenfell	Minorex Limited	983.3	895.3	0.0
Grenfell	Orcana Resources	241.0	228.9	0.0
Grenfell	Vallier, B.	31.1	31.1	0.0
Guibord	Amax Minerals Exploration	75.0	71.3	0.0
Guibord	Cominco Limited	589.5	2.3	0.0
Guibord	Hollinger Mines L	663.6	32.9	0.0
Guibord	Hollinger Mines L	582.2	27.1	0.0
Guibord	Johns-Manville Canada Inc.	62.2	1.0	0.0
Guibord	Ontario Geological Survey	68.9	3.5	59.9
Halliday	Canadian Arrow Mining Ltd.	927.4	10.5	0.0
Halliday	Chevron Standard Limited	2092.2	1695.3	0.0
Halliday	Noranda Exploration Co. Ltd.	106.7	48.5	0.0
Halliday	Northgate Exploration Limited	539.1	7.9	0.0
Harker	Amax Minerals Exploration	6116.2	5031.1	0.0
Harker	Canamax Resources Incorporated	815.0	684.9	0.0
Harker	Lenora Explorations Ltd.	1760.9	1394.2	97.8
Harker	Lenora - Silverhawk JV	2223.6	0.0	2176.6

TABLE 7.4 Continued

Harker	Mary Ellen Resources	598.3	523.6	0.0
Harker	Newmont Expl. Can. Ltd.	2524.5	596.4	1680.7
Harker	Ontario Geologial Survey	149.7	53.3	28.1
Hearst	Amax Exploration Incorporated	111.3	68.6	0.0
Hearst	Amax Minerals Exploration	615.6	556.2	0.0
Hearst	MacGregor, R.A.	841.6	9.8	0.0
Hearst	Pelangio Larder Mines Ltd.	366.8	316.0	0.0
Hearst	Rivard, F.	47.8	47.2	0.0
Hearst	San Rafael Resources	312.1	3.5	0.0
Hearst	Sudbury Contact Mines Limited	1980.6	20.5	0.0
Hearst	Utah Mines Limited	240.2	2.5	0.0
Henwood	Stone-Eplett	2335.4	1923.9	0.0
Hinks	Newmont Exploration Canada Ltd.	782.1	742.3	0.0
Hislop	Ginn, A.P.	615.2	7.6	0.0
Hislop	Hollinger Mines L	405.4	19.8	0.0
Hislop	Ontario Geological Survey	177.5	54.0	61.9
Hislop	Pamour Porcupine Mines Ltd.	122.5	3.0	0.0
Hislop	Young-Davidson Mines Ltd.	111.9	1.2	0.0
Hoblitzell	Noranda Exploration Co. Ltd.	178.8	101.1	0.0
Holloway	Amax Minerals Exploration	287.5	230.2	0.0
Holloway	Argentex Res. Exploration Corp.	3477.9	1747.8	1014.1
Holloway	Canadian Nickel Co. Ltd.	537.1	513.3	0.0
Holloway	Canamax Resources Incorporated	5489.1	3755.2	0.0
Holloway	Condaka Metals L	121.9	102.4	0.0
Holloway	Mary Ellen Resources	1311.5	853.2	329.5
Holloway	McIntyre Porcupine Mines Ltd.	1563.1	1152.6	0.0
Holloway	Ontario Geological Survey	109.0	53.3	38.6
Holmes	Cunningham, L.	373.9	349.0	0.0
Holmes	Minorex Limited	598.1	516.7	0.0
Ingram	Marshall, F.	267.6	2.9	0.0
Katrine	Canhorn Mines	455.1	398.3	0.0
Katrine	Cunningham, L.	249.0	241.4	0.0
Katrine	Kiazyk, B.	497.1	497.1	0.0
Katrine	Lacana Mining Corporation	118.0	115.8	0.0
Katrine	Noranda Exploration Co. Ltd.	67.4	63.1	0.0
Kerrs	Denison Mines Limited	488.6	8.5	0.0
Kerrs	Utah Mines L	262.1	228.6	0.0
Knight	Sutherland & Associates	1577.4	1075.6	0.0
Knight	Timiskaming Nickel Limited	971.7	432.8	0.0
Knight	Whitegate Mining Company	289.6	30.5	0.0
Knox	Amax Minerals Exploration	111.0	77.0	0.0
Lamplugh	Ontario Geological Survey	168.8	69.5	32.3
Lebel	Eden Roc Mineral Corporation	92.4	81.4	0.0
Lebel	Haas-Warner Mining Limited	67.1	57.3	0.0
Lebel	Lacana Mining Corp.	91.7	43.9	0.0
Lebel	Lampe Resources Co. Ltd.	246.0	237.7	0.0
Lebel	North Kirkland Mines	2648.0	2558.2	0.0
Lebel	Rio Tinto Canada Exploration	107.3	100.9	0.0
Lebel	Silver Lake Resources Inc.	7755.2	3239.2	4148.6
Lebel	S.I.S. Resources	1224.1	1186.2	0.0
Lebel	Stewart, A.K.	91.4	0.5	0.0
Macmurchy	Madsen Red Lake Gold Mine Ltd.	160.1	6.2	0.0
Maisonville	Goliath Mines Ltd.	412.1	387.1	0.0
Maisonville	Lacana Mining Company	808.6	757.1	0.0
Maisonville	Noranda Exploration Co. Ltd.	302.4	135.6	0.0
Maisonville	Pryme Energy Res. L.	563.8	500.0	0.0
Maisonville	Queenston Gold Mines	231.1	152.9	0.0
Maisonville	Rio Tinto Canadian Expl. Ltd.	110.0	93.2	0.0
Marriott	Canamax Resources Incorporated	2562.3	2215.2	0.0
Marter	Rio Tinto Canadian Expl. Ltd.	105.8	73.7	0.0
McCann	Ontario Geological Survey	10.4	3.0	7.4

TABLE 7.4 Continued

McCool	Amax Minerals Exploration	131.0	77.0	0.0
McCool	Camrose Gold	198.2	0.3	0.0
McCool	Dominion Asbestos	906.2	1.2	0.0
McCool	Dominion Gulf	2655.7	3.3	0.0
McCool	Grey-Geisler	619.3	0.9	0.0
McCool	Lee Geo-Indicators Limited	113.4	1.0	0.0
McCool	Ontario Geological Survey	131.4	32.6	76.1
McCool	Placer Development Ltd.	1580.5	1077.4	0.0
McCool	Rayville-Matheson	965.0	1.2	0.0
McElroy	Amax Exploration Incorporated	937.8	739.8	0.0
McElroy	Amax Minerals Exploration	796.8	80.8	696.8
McElroy	Lampe Resource Company Limited	242.6	240.2	0.0
McElroy	Superior Northwest Incorporated	1262.8	13.2	0.0
McFadden	San Rafael Resources	308.1	3.5	0.0
McGarry	Amalgamated Larder Mines Ltd.	269.7	247.5	0.0
McGarry	Forbes, C. Leahy, M.	122.2	119.2	0.0
McGarry	Kennco Expl. L.	2171.2	508.7	1351.6
McGarry	Kerr Addison Mines L.	467.3	392.3	0.0
McGarry	Lampe Resource Company Ltd.	209.1	204.5	0.0
McGarry	Noranda Exploration Co. Ltd.	952.8	921.1	0.0
McGarry	Walker, J.O.	482.9	8.0	0.0
McNeil	Manville Canada Incorporated	142.4	2.0	0.0
McNeil	Noranda Exploration Co. Ltd.	133.8	88.7	0.0
McNeil	Weekley, L.	1578.8	1321.1	106.7
McVittie	Amalgamated Larder Mines Ltd.	1192.9	1084.9	0.0
McVittie	Bustraen, M.	587.3	7.3	0.0
McVittie	Edomar Res I	1657.9	914.5	680.3
McVittie	Eldor Res	1408.5	0.0	1488.6
McVittie	Lenora Explorations Ltd.	9209.4	8313.0	0.0
McVittie	MacGregor, R.A.	97.5	1.0	0.0
McVittie	Noranda Exploration Co. Ltd.	69.0	69.0	0.0
McVittie	Smith, L.	99.4	1.6	0.0
McVittie	Sudbury Contact L.	1889.1	1812.4	0.0
McVittie	Swansea Gold Mines Limited	798.4	561.0	0.0
Melba	Here Fault Copper Limited	1204.0	835.0	0.0
Melba	Rosario Resources Canada Ltd.	381.3	372.2	0.0
Michaud	Amax Minerals Exploration	221.0	187.0	0.0
Michaud	Ontario Geological Survey	136.2	15.6	82.9
Michaud	Redstone Resources Incorporated	700.4	570.9	0.0
Michaud	Renzy Mines Limited	2197.2	19.1	0.0
Midlothian	Larche-Rousseau	1133.7	17.2	0.0
Midlothian	Regal Goldfields Limited	1524.9	1473.6	0.0
Midlothian	United Asbestos L.	625.2	99.1	306.2
Milligan	Ontario Geological Survey	180.6	58.4	73.8
Milligan	Yellow Sands	183.5	107.9	0.0
Milner	Sutherland, D.	126.5	1.8	0.0
Montrose	Canamax Res I.	631.1	606.5	0.0
Montrose	Hanna Mining Company	90.4	66.9	0.0
Moody	Mistango River Mines	2325.0	2.5	0.0
Moody	Utah Mines Ltd.	844.9	756.2	0.0
Morrisette	Chorzepa, E.	121.9	121.9	0.0
Morrisette	Edda Resources Inc.	175.6	161.8	0.0
Morrisette	Merrick, A., Link, T.	156.4	152.1	0.0
Morrisette	Rosario Resources Canada Ltd.	769.6	617.8	0.0
Morrisette	Ward, J.T.	99.7	96.6	0.0
Munro	Amax Minerals Exploration	1927.7	1793.7	0.0
Munro	Canadian Johns-Manville	374.9	1.6	0.0
Munro	Mangan-Dyer	533.7	1.9	0.0
Munro	Ontario Geological Survey	117.8	31.2	33.2
Munro	Reoplata Mines Ltd.	197.2	0.6	0.0
Munro	Zevely, P.B.	1036.4	1.4	0.0

TABLE 7.4 Continued

Natal	Sutherland & Associates	882.4	405.4	0.0
Natal	Timiskaming Nickel Limited	440.7	119.8	0.0
Newman	Noranda Exploration Co. Ltd.	310.8	189.3	0.0
North Williams	Metron Exploration Limited	30.8	1.0	0.0
Noseworthy	Newmont Exploration Canada Ltd.	926.1	780.2	0.0
Ossian	Lacana Mining Company	163.1	128.0	0.0
Ossian	Noranda Exploration Co. Ltd.	127.7	120.1	0.0
Ossian	Rio Tinto Canada Exploration	124.5	112.0	0.0
Otto	Minorex Limited	292.3	275.9	0.0
Otto	Noranda Exploration Co. Ltd.	378.9	333.4	0.0
Otto	Reed, J.D.	93.6	84.7	0.0
Otto	Rio Tinto Canada Exploration	116.4	110.9	0.0
Pacaud	Laskowski, H.	317.6	310.0	0.0
Pense	Gereghty, G.J.	466.0	6.5	0.0
Pense	Hudson Bay Mining Limited	99.7	1.7	0.0
Playfair	Cunningham, L.	213.7	155.8	0.0
Playfair	Ontario Geological Survey	95.1	12.5	21.0
Playfair	Playfair Resources	311.2	225.0	0.0
Powell	Welsh, G.	121.6	1.4	0.0
Rand	Ontario Geological Survey	199.0	53.4	18.5
Rattray	Noranda Exploration Co. Ltd.	214.0	2.3	0.0
Rickard	Amax Minerals Exploration	695.0	455.5	0.0
Robillard	MacDonald, H.W.	141.7	0.3	0.0
Robillard	Maidment, E.	94.2	94.2	0.0
Sangster	Shell Canada Resources Inc.	664.1	601.6	0.0
Skead	Canadian Nickel Company Ltd.	745.6	7.6	0.0
Skead	Ferguson, R.	141.8	134.1	0.0
Skead	Noranda Exploration Co. Ltd.	223.4	2.3	0.0
Skead	Rio Tinto Canada Exploration	741.5	8.0	0.0
Skead	Superior Northwest Incorporated	607.1	6.7	0.0
Skead	Utah Mines Limited	445.4	5.0	0.0
Sothman	Manville Canada Incorporated	163.9	2.5	0.0
Stoughton	Nufort Resources Incorporated	857.3	798.7	0.0
Stoughton	Ontario Geological Survey	39.0	5.3	0.0
Tannahill	Amax Minerals Exploration	164.8	119.8	0.0
Tannahill	Condaka Minerals Expl.	1403.9	441.4	678.4
Taylor	N.A. Timmins Expl.	1031.9	0.9	0.0
Taylor	Ontario Geological Survey	294.0	61.1	32.8
Teck	Chorzepa, E.	61.0	59.7	0.0
Teck	Eden Roc Mineral Corporation	359.4	339.8	0.0
Teck	Forbes, C., Leahy, M.	329.5	326.2	0.0
Teck	Guaranty Trust Company	197.0	190.0	0.0
Teck	Harrington, P.	754.9	704.7	0.0
Teck	Labrador Exploration Limited	686.7	657.2	0.0
Teck	Lac Minerals	1050.4	990.2	0.0
Teck	Lake Shore Mines Limited	3523.5	2045.1	0.0
Teck	Marshall Minerals	164.9	163.1	0.0
Teck	McKinnon, D.	49.1	0.5	0.0
Teck	Newfield Mines	1592.5	1345.8	0.0
Teck	Newmont Expl. of Canada Ltd.	1900.5	1806.2	0.0
Teck	S.I.S. Resources	156.1	153.3	0.0
Teck	Stewart, A.K.	244.9	233.4	0.0
Teck	Wright-Hargreaves Mines Ltd.	760.1	575.8	0.0
Teefy	Amax Minerals Exploration	994.0	541.6	0.0
Teefy	Canamax Resources Incorporated	1622.7	938.2	0.0
Thackeray	Dominion Gulf C.	182.9	0.6	0.0
Thackeray	Noranda Exploration Company Ltd.	135.9	96.9	0.0
Thackeray	Ontario Geological Survey	185.7	10.1	29.6
Tomlinson	Noranda Exploraiton Company Ltd.	406.4	217.0	0.0
Tweed	Utah Mines Limited	196.6	140.5	0.0
Tyrrell	Sutherland & Associates	309.4	133.2	0.0

TABLE 7.4 **Continued**

Tyrrell	Timmins Gold Resources	1034.2	615.9	0.0
Walker	Canamax Resources Incorporated	114.0	65.4	0.0
Walker	Hollinger Argus L.	295.9	12.2	0.0
Walker	Hollinger Mines L.	120.4	5.5	0.0
Walker	Noranda Exploration Co. Ltd.	271.3	268.5	0.0
Walker	Ontario Geological Survey	119.4	16.5	9.1
Walker	Surveymin Limited	340.4	273.7	0.0
Warden	Amax Minerals Exploration	195.0	100.4	0.0
Warden	Dyman Pros. Synd.	93.1	0.2	0.0
Warden	Mangan-Dyer	375.2	0.5	0.0
Warden	Ontario Geological Survey	43.9	7.0	23.2
Wilkie	Amax Minerals Exploration	177.0	130.8	0.0
Wilkie	Hollinger Argus L.	646.8	29.9	0.0
Wilkie	Nahanni Mines Limited	579.8	527.1	0.0
Wilkie	Noranda Exploration Co. Ltd.	237.4	163.9	0.0
Zavitz	Newmont Exploration Canada Ltd.	640.3	502.8	0.0

including Rare Earth Element distributions within the overburden stratigraphy. M.B. McClenaghan, formerly with the Geophysics/Geochemistry Section, began graduate work at Queen's University in September using selected BRIM sonic overburden drillhole core. Her research is designed to analyze comprehensively, and characterize the Quaternary stratigraphy in the BRIM area.

Geologists with the Mineral Deposits Section of the Ontario Geological Survey continued investigations regarding the metallogeny of the BRIM area (Whittaker 1986a, 1986b). During 1986, mineralization at the St. Andrew Goldfields Deposit (Stock Township), the Clavos Deposit (Stock and German Townships), the Montclerg Deposit (Clergue Township) (Malczak 1986), and the Ross Mine (Troop 1986) were studied in detail. An Ontario Geological Survey Open File Report discussing mineralization and metallogeny of the BRIM area is expected to be completed during 1987.

Geophysicists with the Geophysics/Geochemistry Section of the Ontario Geological Survey continue to analyze regional gravity data obtained during the 1984 and 1985 field seasons. Average sampling density of the survey was about 1 sample per km^2. Results of the survey are expected to be released early in 1987 and will be in the form of Bouguer gravity, residual gravity, and either first or second derivative gravity maps (scale 1:100 000) and will cover that part of the BRIM area which lies south of Highway 101.

As part of Operation Black River-Matheson, an economic geologist is based in Kirkland Lake to encourage exploration activity at the local level by being available to all members of the exploration community as a source of exploration-related information and advice. Efforts of the economic geologist are directed toward promoting the BRIM area, catalyzing the property optioning process, interfacing between the public and private sectors, and, in general, to providing services that facilitate exploration. Specifically, the exploration geologist is available to:

1. assist local prospectors with property visits, advice, and assessment file searches
2. document new mineral occurrences
3. more fully describe previously documented mineral occurrences
4. compile data relevant to exploration
5. help "orient" new workers or potential new workers to the area

Activities of the BRIM economic geologist during 1986 are described in Bath (1986).

Compilation of Geological Data Inventory Folios (GDIFs) by K.D. Kalicharran and the staff at the office of the Resident Geologist in Kirkland Lake is ongoing. During 1986, GDIFs for the townships of Beatty and Holloway (GDIF Numbers 266 and 272, respectively) were released. GDIFs for the townships of Barnet, Cook, Dokis, Egan, Elliott, Harker, McCann, Tannahill, Thackeray, and Playfair (GDIF Numbers 349, 356, 352, 342, 350, 358, 343, 351, 357, and 344, respectively) will be released early in 1987.

As of November 30, 1986, about 46 000 m of diamond-drill core from 513 holes, representing nearly 81 000 m of diamond drilling in the BRIM area have been cataloged and shelved and are available for examination and sampling at the Larder Lake and Porcupine Mining Divisions Drill Core Storage Libraries. Also available for examination are bedrock and overburden samples from the 1984 and 1985 BRIM sonic overburden drilling program. Continued cataloging of about 12 000 hand sample rock specimens, collected by L. Jensen during his bedrock mapping of the Lightning River, Magusi River, and Ramore areas (which includes the eastern and south-central parts of the BRIM area) by staff at the Larder Lake Mining Division Core Storage Library is ongoing.

Redman *et al.* (1986) investigated the possibility of mapping the Porcupine-Destor Fault Zone in Stock and Taylor Townships (where it subcrops under Quaternary overburden) by audio frequency magnetotelluric methods.

MacRae and Nesbitt (1986) investigated the efficacy of using the trace element content of vein pyrite from the Canadian Arrow Mine (Hislop Township) as an aid in distinguishing between auriferous and nonauriferous vein systems.

The results of bedrock geological mapping in the southern part of the Ramore area were released during 1986; the southern parts of McCann, Playfair, Cook, Barnet, and Thackeray Townships are included in these maps (Jensen 1986a,b,c).

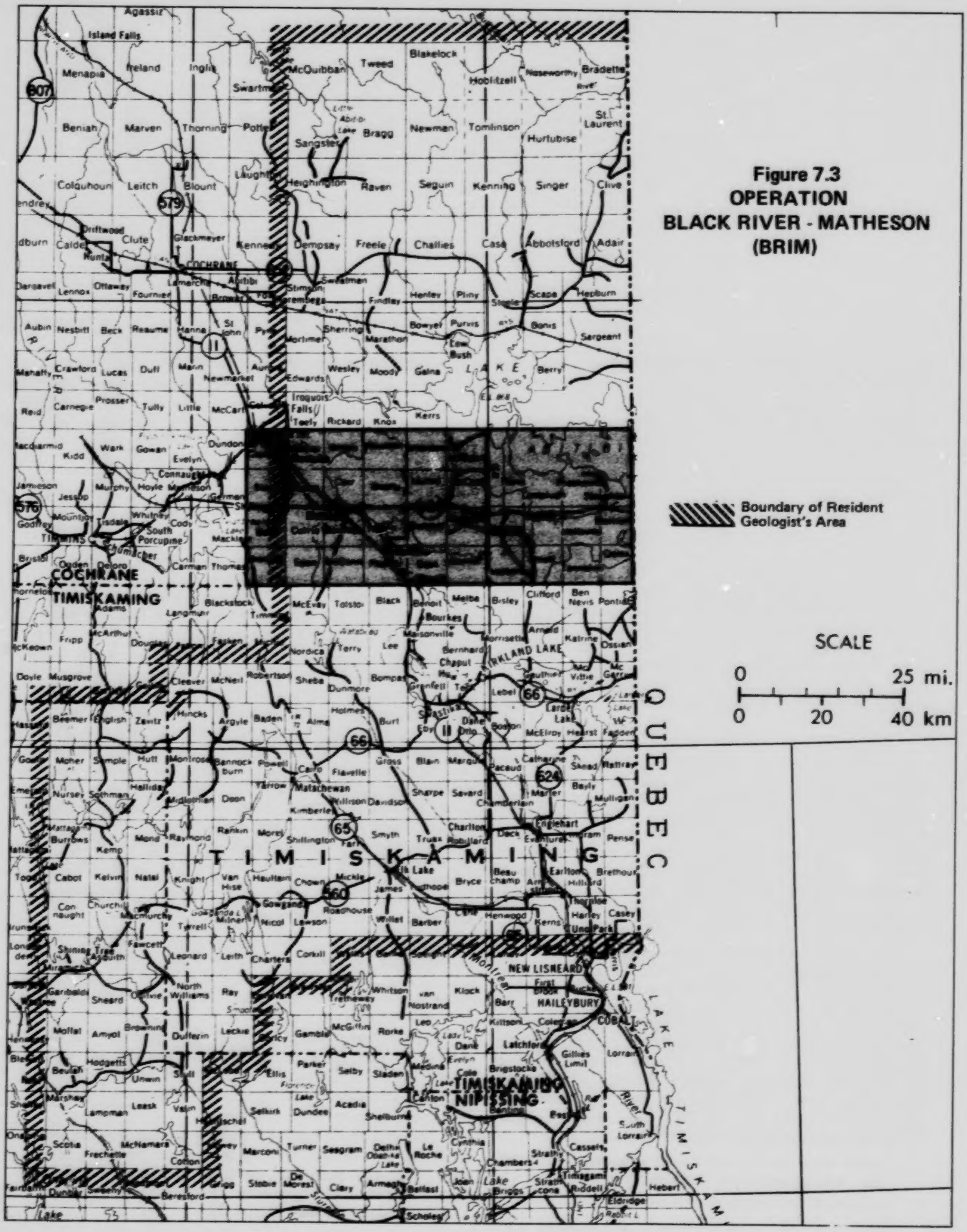

Figure 7.3
OPERATION
BLACK RIVER - MATHESON
(BRIM)

Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
QUEBEC
COCHRANE
TIMISKAMING
TIMISKAMING
NIPISSING
KIRKLAND LAKE
NEW LISKEARD
HAILEYBURY
COBALT
TIMMINS
IROQUOIS FALLS
LAKE TIMISKAMING
LAKE ABITIBI
11
66
65
560
624
579
576
807

TABLE 7.5: MAPS AND REPORTS PERTAINING TO THE BRIM AREA PUBLISHED DURING 1986 AND EARLY 1987 BY THE OGS AND MNDM

Township	Misc. Reports	Maps
BRIM	MP 128 pp.179-215, OFR 5569 MP 129 pp.69-87, MP 132 pp.389-432	Maps P.2958, P.2983, P.2986
Barnet	GDIF 349	Map P.3053
Beatty	GDIF 266	Maps 80763, 80764, 80766, 80768, 80770, 80771, 80794, P.2842
Bond		Map 80785
Bowman	OFR 5615	Maps 80759, 80776, 80777, 80793, P.2842
Carr		Maps 80761, 80762, 80765, 80767, 80777, 80779, 80792, 80793
Clergue		Maps 80795, 80847, 80848, 80849
Cook	GDIF 356	Maps P.3052, P.3053, 80843, 80893
Coulson		Map 80794
Currie		Maps 80760, 80780, 80781, 80783, 80793
Dokis	GDIF 352	Map P.2842
Egan	GDIF 342	Map 80891
Elliott	GDIF 350	Map 80865, 80840
Frecheville		
Garrison		Maps 80867, 80868, 80844, 80875, 80886
Guibord		Maps 80852, 80843
Harker	GDIF 358	Maps 80840, 80875, 80876, 80877, 80878, 80885
Hislop	OFR 5622	Maps 80769, 80772, 80773, 80775, 80794
Holloway	GDIF 272	Maps 80838, 80882, 80883, 80885
Ind.Res. 70		Maps 80871, 80873, 80841
Lamplugh		Maps 80839, 80879, 80880, 80881
Marriott		Map 80838
McCann	GDIF 343	Maps 80776, 80796, P.3052
McCool		Maps 80858, 80859, 80860, 80842, 80887, P.2842
Michaud		Maps 80859, 80861, 80862, 80843
Milligan		Maps 80855, 80856, 80857, 80842
Munro		Maps 80851, 80853, 80842, P.2842
Playfair	GDIF 344	Maps 80773, 80774, 80796, P.3052
Rand		Maps 80869, 80870, 80872, 80874, 80841
Sheraton		Maps 80793, 80889, 80890
Stock	MP 130, pp.170-176	Maps 80784, 80786, 80787, 80788, 80789, 80790, 80793
Stoughton		Maps 80838, 80884
Tannahill	GDIF 351	
Taylor		Maps 80778, 80782, 80784, 80791, 80792, 80793, 80850, 80893
Thackeray	GDIF 357	Maps 80863, 80864, 80866, P.3053, 80841
Walker		Maps 80795, 80845, 80846
Warden		Maps 80854, 80842
Wilkie		Map 80795

EXPLORATION ACTIVITIES IN THE BRIM AREA

Figure 7.4 and accompanying Table 7.6 constitute an updated compilation of documented precious and base-metal occurrences present within the BRIM area. Sources for the compilation include assessment files at the offices of the Resident Geologists in Kirkland Lake and Timmins; provincial Geological Data Inventory Folios (GDIFs), Mineral Deposit Circulars (MRCs), and Source Mineral Deposit Records (SMDRs); federal National Mineral Inventory (NMI) cards; and newspaper clippings. It should be noted that this map is being updated concurrently with compilation of GDIFs and is current through November, 1986. A more complete version will appear at a later date.

A brief description of many of the exploration activities carried out in the BRIM area during 1986 appears below. Summaries of additional exploration programs appear in Table 7.3.

Accord Resources Incorporated has further consolidated its land position in the Stoughton/Frecheville area, and has had airborne geophysical surveys flown over its holdings there.

Adola Mining Corporation and Glen Auden Resources Limited, in joint venture, are currently evaluating a property straddling the Porcupine-Destor Fault Zone in Taylor Township.

American Barrick Resources Corporation has completed the sinking of a 1400-foot, three compartment exploration shaft on its Holt-McDermott Property

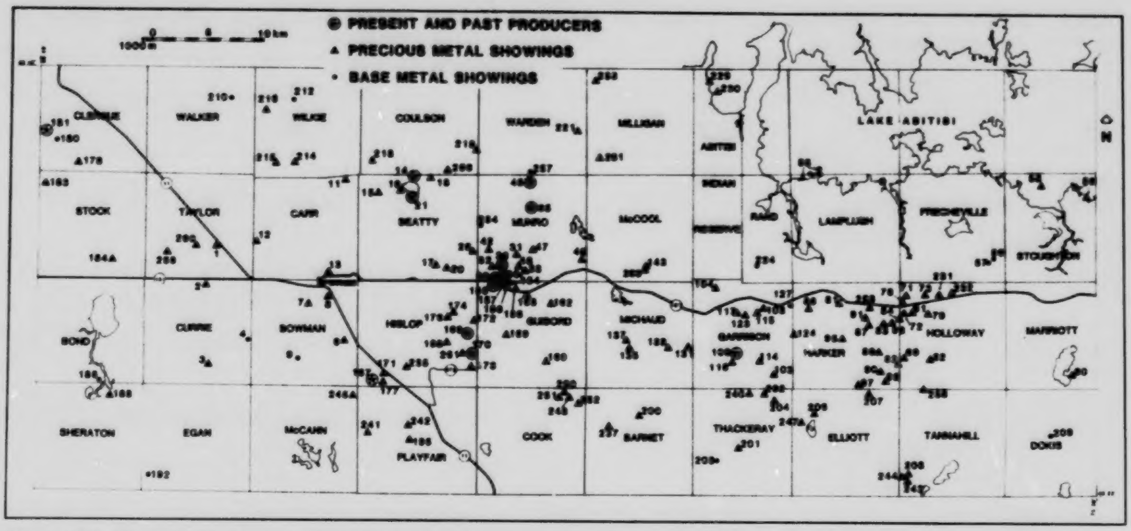

Figure 7.4. Documented precious and base metal occurrences within the BRIM area. Map numbers used are consistent with those used in Bath 1985. (Figure 084.5). For index and selected references *see* Table 7.6.

in Holloway Township, and has begun drifting. On December 6, 1986, it was announced that Barrick would invest $50 million on the Holt-McDermott Mine and 1500 ton per day mill complex with plans to bring the deposit into production by 1988 (Kirkland Lake Northern Daily News, December 5, 1986). American Barrick Resources continued diamond drilling on its Worvest joint venture (65 percent Barrick, 35 percent Lenora Explorations Limited), a claim group located about 2 km west of and along strike from the Holt-McDermott Deposit, in Harker Township.

Argentex Resource Exploration Corporation (operator) in joint venture with New Strategic Metals Incorporated and Canadian Nickel Company Limited (Canico) has completed a geophysical survey and is diamond drilling on its claim group in Holloway Township.

Bay Resources et Services Incorporécompleted a program of linecutting and magnetic surveying on its claim group in Frecheville Township, as well as a magnetic survey over its claim group in the Milligan-Warden Township area.

Canamax Resources Incorporated continued to diamond drill its "East Zone" deposit in Holloway Township where drill-indicated reserves of 578 000 tons grading 0.246 ounce gold per ton have been drill-defined within the Porcupine-Destor Fault Zone (The Northern Miner, January 27, 1986). During 1986, Canamax diamond drilled 58 holes (total 9772 m) on the "East Zone". Diamond drilling also continued at the Clavos joint venture in Stock and German Townships (67 percent Canamax, 33 percent Bruneau Mining Company Limited). Seventy-nine holes, with an aggregate length of 15 633 m were diamond drilled on the property in 1986. Reserves at Clavos of about 470 000 tons grading 0.212 ounce gold per ton have been drill-defined (The Northern Miner, June 16, 1986).

Chevron Minerals Limited has begun exploration work on the Gunnar Property in Hislop Township which it optioned from Stroud Resources Limited. Previous work on the property by Gunnex Limited outlined 102 500 tons grading 0.17 ounce gold per ton (The Northern Miner, August 18, 1986). Chevron also completed a ten-hole overburden drilling program in Currie Township.

Cominco Limited (as operator) and Jonpol Explorations Limited continued to diamond drill their Garrcon Property joint venture in northern Garrison Township. Diamond drilling in 1985 established the presence of two parallel auriferous zones located about 1800 feet (550 m) apart which are located north and south of the old Garrcon workings. Jonpol budgeted an additional $100 000 to the previously committed $340 000 for exploration on the property. Immediately east of the Garrcon Property in Garrison Township, Jonpol began drilling on the Linton and Brydges claim groups. On the Brydges Property, a ground electromagnetic survey is reported to have defined the eastern extension of the Garrcon South zone (The Northern Miner, May 12, 1986).

Condaka Metals Corporation completed a 12-hole diamond drilling program on a 40-claim property in Holloway and Tannahill Townships.

Core Energy Corporation completed three diamond-drill holes totaling 1302 feet (397 m) on magnetic- and induced polarization-defined targets on its two-claim Harley Property in Harker Township.

Dickenson Mines Limited and New Cinch Uranium Limited began a 3000-foot drilling program on their claim block in Harker Township that was formerly under option to Kerr Addison Mines Limited.

Edda Resources Incorporated completed an airborne electromagnetic survey over its 217-claim block in Frecheville and Stoughton Townships.

TABLE 7.6: INDEX AND SELECTED REFERENCES FOR OCCURRENCES LOCATED ON FIGURE 7.4

No.	Name	Commodity	Selected References
1	Turney	Au	GDIF, MDIR C0109, MRC 13 p.136, OFR 5467, Maps P.39, 80583
2	Anderson	Au	GDIF, MDIR C0291, NMI 42A/10 Au 1, MRC 13 p.127, OFR 5467, GR 40 p.14, AR 40 pt.3 p.21
3	S. Reid	Au	GDIF, MDIR C0290, NMI 42A/07 Au 6, MRC 13 p.127, OFR 5467, GR 40, AR 40 pt.3 p.21
4	Tillex Syndicate	Cu Ag Zn	GDIF, MDIR C0283, NMI 42A/10 Cu 1, GR 40, Maps P.856, 80593
6	Sylvanite No. 1	Au	GDIF, MDIR C0288, NMI 42A/08 Au 3 (Au 1), OFR 5467, MRC 13 p.123, GR 40 p.16, Map 80594, P.2860
7	Sylvanite No. 2	Au	GDIF, MDIR C0287, NMI 42A/10 (Au 2, 26), OFR 5467, MRC 13 p.123, GR 40 p.17, Map 80594
8	Sylvanite No. 3	Au	GDIF, MDIR C0286, NMI 42A/09 Au 27, MRC 13 p.123, GR 40 p.17, Maps P.837, 80594
9	Pollock-Briscoe	Cu	GDIF, MDIR C0282, NMI 42A/08 Cu 1, MDC 12 p.131, GR 40 p.18, MP 63 p.104-106, MP 132 p.421-430, Maps P.837, 80594, P.2860
11	Wilcarr (Nos. 1,2)	Au Cu Zn	GDIF, MDIR C0155, NMI 42A/09 Au 33, OFR 5467, MRC 13 p.125, AR 60 pt.4 p.21, AR 28 pt.2 p.63, MP 132 p.421-430, Map P.854
12	Watabeag	Au	GDIF, NMI 42A/10 Au 12, OFR 5467, MRC 13 p.125, AR 60 pt.4 p.20, MP 132 p.421-430, Maps P.854, 80584
13	Black River	Au	GDIF, NMI 42A/09W Au 17, MRC 13 p.125, AR 60 pt.4 p.20, AR 28 pt.2 p.62-63, Maps P.854, 80584
14	Aljo	Au	GDIF, MDIR C0153, NMI 42A/09 Au 3, SMDR 2350, MRC 13 p.45-47, OFR 5467, AR 24 pt.1 p.182, AR 28 pt.2 p.61, AR 46 to 48 pt.1, AR 50 pt.1, AR 56 pt.7 p.20-23, MP 119 p.59-62/291, MP132 p.392-397
15	Maude Lake	Au	GDIF, MDIR C0152, NMI 42A/09 Au 6, SMDR 2351, MRC 13 p.47, OFR 5467, AR 56 pt.7 p.25-26, AR 28 pt.2 p.56-59, MP 126 p.316-319, MP 119 p.59-62/278-279, MP 132 p.392-397/404-407, Maps 1947-2, OFM50
17	Beatty Syndicate	Au	GDIF, MDIR C0150, NMI 42A/9 Au 19, SMDR 2352, MRC 13 p.123, OFR 5467, AR 56 pt.7 p.26-27, Maps 1947-2, 80585
18	Clifford	Au	GDIF, MDIR C0148, NMI 42A/9 Au 42, SMDR 2353, MRC 13 p.123, OFR 5467, AR 56 pt.7 p.27, AR 28 pt.2 p.56-59/64, AR 24 pt.1 p.181, MP 132 p.392-397, Maps 1947-2, OFM50, 80585
19	Lucky Ben	Au	GDIF, MDIR C0147, SMDR 2354, MRC 13 p.123, NMI 42A/9 Au 22, OFR 5467, AR 56 pt.7 p.29, AR 24 pt.1 p.102, AR 28 pt.2 p.60-61, MP 119 p.291, MP 132 p.392-397, Maps 1947-2, OFM50, 80585
20	Stewart-Abate	Au	GDIF, MDIR C0154, SMDR 2355, NMI 42A/9 Au 2, MRC 13 p.49/123, OFR 5467, AR 51 pt.1 p.192, AR 56 pt.7 p.30, AR 24 pt.1 p.180-181, AR 28 pt.2 p.53-54, MP 119 p.291, MP 132 p.421-430, Maps 1947-2, 80585
21	Blue Quartz	Au	GDIF, NMI 42A/9 Au 1, MRC 13 p.48, OFR 5467, AR 56 pt.7 p.23-25, AR 46 pt.1 p.14, MP 111 p.145, AR 28 pt.2 p.58, MP 119 p.291, MP 132 p.392-397, Maps P.864, 1947-2, OFM50, 80585

TABLE 7.6: Continued

No.	Name	Commodity	Selected References
26	Pat Occurrence	Au	GDIF, NMI 42A/9 Au 41, MRC 13 p.123, OFR 5467, AR 56 pt.7 p.29, MP 132 p.421-430, Maps P.864, 80585
30	American Eagle	Au	GDIF, MDIR C0146, NMI 42A/9 Au 4, OFR 5467, MRC 13 p.80, AR 60 pt.8 p.45, AR 64 pt.1 p.15, AR 24 pt.1 p.181, AR 28 pt.2 p.53-54, MP 119 p.59-62, Maps P.866, 80586
31	Big Game	Au	GDIF, MDIR C0145, NMI 42A/9 Au 11, OFR 5467, MRC 13 p.134, AR 60 pt.8 p.45, Maps P.866, 80586
32	Brown-Munro	Au	GDIF, MDIR C0086, OFR 5467, AR 60 pt.8 p.46, AR 28 pt.1 p.115/pt.2 p.55, MP 132 p.421-430, Maps P.866, 80586
33	Buff-Munro	Au	GDIF, NMI 42A/9 Au 7, OFR 5467, MRC 13 p.134, AR 60 pt.8 p.47, AR 28 pt.2 p.55, Maps P.866, 80586
35	Centre Hill	Cu	GDIF, NMI 42A/9 Cu 1, SMDR 830, MRC 12 p.124, MDIR C0143, MRC 2, AR 60 pt.8, AR 67 pt.2 p.3, Maps P.866, 80586
36	Croesus	Au	GDIF, NMI 42A/9 Au 13, MDIR C0140, MRC 13 p.81, OFR 5467, AR 60 pt.8 p.48, AR 24 pt.1 p.180-182, AR 28 pt.1 p.115/pt.2 p.53-57, AR 46 pt.1, AR 47 pt.1, MP 117 p.145, MP 119 p.59-62/291, MP 132 p.404
42	Northern Gold Belt	Au Ag	GDIF, NMI 42A/9 Au 44, MRC 13 p.134, OFR 5467, AR 24 pt.1 p.176, AR 60 pt.8 p.51, MP 132 p.421-430, Maps P.866, 80586
45	Potterdoal	Cu	GDIF, NMI 42A/9 Cu 2, MDIR C0141, MDC 17 p.44, SMDR 925, MRC 12 p.126, AR 60 pt.8 p.42, MP 119 p.59-62/291, MP 132 p.392-397, Maps P.866, OFM50, 80586
46	Reoplata	asb Au	GDIF, NMI 42A/9 Au 34 asb 25, MRC 13 p.134, IMR 36 p.29/57, AR 60 pt.8 p.42, Maps P.866, 80586
47	W.T. Stewart	Au	GDIF, NMI 42A/9 Au 28, MDIR C0089, OFR 5467, MRC 13 p.134, AR 60 pt.8 p.52, Maps P.866, 80586
50	White-Guyatt	Au	GDIF, NMI 42A/9 Au 36, MDIR C0087, OFR 5467, MRC 13 p.81, AR 24 pt.1 p.177-181, AR 28 pt.2 p.23-24/53-54, AR 50 pt.1 p.211-212, AR 51 pt.1 p.142, AR 60 pt.8 p.53, MP 119 p.59-62, Maps P.866, 80586
55	Lamplugh	Fe	NMI 32D/12 Fe 4, MRC 11 p.121, Maps P.799, P.2433, P.2431, 80589
56	Float No. 1	Cu	MRC 17 p.47, Map P.798, Maps P.2433, P.2432, 80590
57	Float No. 2	Cu	MRC 17 p.48, Map P.798, Maps P.2433, P.2432, 80590
58	Island 524SV	Au Cu	GDIF, MDIR C0284, OFR 5467, GR 173 p.58/61, Maps P.2433, P.2432, 80591
59	Boundary Bay	Au	GDIF, OFR 5467, GR 173, AR 27 pt.1 p.208, AR 28 pt.2 p.44/52, Maps P.2432, P.2433, 80591
60	G.C. Roy	Cu	GDIF, MRC 11 p.131, GR 173, MP 132 p.421-430, Map P.824, P.888, P.2432, P.2433, 80601
61	Holt-McDermott	Au	GDIF, OFR 5467, MRC 13 p.131, NMI 32D/12 Au 4, AR 62 pt.7 p.29, AR 34 pt.6 p.96, GOLD 86 p.184-190, MP 119 p.291, MP 132 p.404-407, Maps P.2432, P.2433, OFM65, 80600
62	Coin Lake G.M.L.	Au	GDIF, OFR 5467, MRC 13 p.131, AR 34 pt.6 p.95, AR 28 pt.2 p.12-14/44-51, Maps P.2432, P.2433
69	Meridian	Au	GDIF, MRC 13 p.131, AR 28 pt.2 p.49-50, AR 34 pt.6 p.95, Maps P.797, P.2432, P.2433, 80600
71	Mining Corp., N. Gp.	Au	GDIF, MDIR C0216, OFR 5467, AR 62 pt.7 p.32, AR 34 pt.6 p.37, Maps P.797, P.2433, P.2432, 80600

TABLE 7.6: Continued

No.	Name	Commodity	Selected References
72	O'Neill	Au	GDIF, NMI 32D/12 Au 13, OFR 5467, MRC 13 p.131, AR 62 p.7/32, AR 34 pt.6 p.96, Maps P.797, P.2433, P.2432, 80600
73	Remo	Au	GDIF, NMI 32D/12 Au 5, OFR 5467, MRC 13 p.131, AR 62 pt.7 p.33, Maps P.797, P.2433, P.2432, 80600
76	Teddy Bear	Au	GDIF, NMI 32D/12 (prelim.), OFR 5467, MRC 13 p.77, AR 62 pt.7 p.33, AR 33 pt.3 p.45, AR 34 pt.6 p.93/97, MP 119 p.290-294, MP 132 p.404-407, Maps P.2433, P.2434, OFM65, 80600
79	Canamax	Au	GDIF, MRC 13 p.131, NMI 32D/12 Au 4, AR 62 pt.7 p.28, Maps P.797, P.2433, P.2432, 80600
81	Anatole Resources	Au	GDIF, NMI 32D/12 Au 2, OFR 5467, MRC 13 p.130, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
82	Coin Lake	Au Ag	GDIF, MDIR C0315, NMI 32D/5 Au 10, OFR 5467, MRC 13 p.71, AR 28 pt.2 p.50, AR 60 pt.7, Maps P.897, P.2432, P.2431
83	Consular Harker	Au	GDIF, MDIR C0314, NMI 32D/12 Au 15, OFR 5467, MRC 13 p.130, AR 60 pt.7, Maps P.897, P.2433
84	Ben Arch	Au	NMI 32D/12 Au 3, MRC 13 p.130, AR 28 pt.2 p.51, AR 34 pt.6 p.95, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
86	Dale	Au Fe	NMI 32D/12 Au 9 and Fe 2, MRC 11 p.117, MRC 13 p.130, OFR 5467, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
87	Demers	Au	GDIF, MRC 13 p.130, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
89	Harlight	Au	GDIF, MDIR C0318, OFR 5467, MRC 13 p.72, AR 34 pt.6 p.95, AR 60 pt.7, MP 119 p.291, Maps P.897, P.2433, P.2431, 80599
90	Golden Harker	Au	GDIF, MDIR C0318, NMI 32D/5 Au 9, OFR 5467, MRC 13 p.72, AR 28 pt.2 p.51-52, AR 34 pt.6 p.87-98, AR 60 pt.7, MP 119 p.291, MP 132 p.404-407/421-430, Maps P.897, P.2433, P.2431, OFM65, 80599
91	Imperial Reserve #1	Au	GDIF, MDIR C0317, NMI 32D/12 and 5 Au 8, OFR 5467, MRC 13 p.130, AR 34 pt.6 p.94-95, AR 60 pt.7, Maps P.897, P.2433
92	Iris	Au	GDIF, MDIR C0316, OFR 5467, MRC 13 p.130, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
93	Lenora Explorations	Au	GDIF, Maps P.897, P.2433, P.2431, 80599
95	Imperial Reserve #2	Au	GDIF, OFR 5467, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
97	Toronto Harker	Au	GDIF, MRC 13 p.130, AR 60 pt.7, Maps P.897, P.2433, P.2431, 80599
103	Bambi	Au	GDIF, MDIR C0305, NMI 32D/5 Au 4, OFR 5467, MRC 13 p.127, AR 34 pt.6 p.98, AR 58 pt.4 p.17, Maps P.868, P.2433, 80598
104	Bird-Ginn	asb Au	GDIF, MDIR C0370, NMI 32D/12 asb 1, IMR 36 p.27/44/59, AR 28 pt.2 p.52, Maps P.868, P.2433, P.2431, 80598
108	Brydges	Au Ag	GDIF, MDIR C0306, NMI 32D/12 Au 18, OFR 5467, MRC 13 p.127, AR 58 pt.4, Maps P.868, P.2433, 80598
109	Murphy Pit	Au	GDIF, MDIR C0307, NMI 32D/5 Au 7 Au 19, OFR 5467, MRC 13 p.68, AR 46 pt.1 p.94-95, AR 58 pt.4, MP132 p.404-407/421-430, Maps P.868, OFM65, 80598
114	Garrison Harbour	Au Ag	GDIF, MDIR C0308, NMI 32D/5 Au 16, OFR 5467, MRC 13 p.128, AR 58 pt.4, Maps P.868, P.2433, 80598
115	Garrcon	Au	GDIF, MDIR C0309, NMI 32D/12 Au 10, OFR 5467, MRC 13 p.69, AR 46 pt.1 p.118/135, AR 47 pt.1 p.124, AR 58 pt.4, MP 119 p.291, MP 132 p.404-407, Maps P.868, P.2433, OFM65, 80598

TABLE 7.6: Continued

No.	Name	Commodity	Selected References
116	Grimston	Au	GDIF, MDIR C0310, NMI 32D/5 Au 1, OFR 5467, MRC 13 p.69, AR 34 pt.6 p.98, AR 58 pt.4, Maps P.868, P.2433, 80598
117	Hastings	Au	GDIF, MRC 13 p.128, AR 58 pt.4, MP 132 p.421-430, Maps P.868, P.2433, P.2431, 80598
123	Newfield	Au	GDIF, NMI 32D/12 Au 12, OFR 5467, MRC 13 p.128, AR 58 pt.4, Maps P.868, P.2433, P.2431, 80598
124	Shunsby	Au	GDIF, MDIR C0311, NMI 32D/5 Au 17, OFR 5467, MRC 13 p.128, AR 58 pt.4, AR 60 pt.7 p.40, Maps P.868, P.2433, 80598
127	Thackeray Creek	Fe	NMI 32D/12 Fe 1, MRC 11 p.116, AR 58 pt.4, Maps P.868, P.2433, P.2431, 80598
131	Caswell	Fe Au	NMI 42A/8 Au 31 and Fe 1, MDIR C0304, OFR 5467, MRC 11 p.122, MRC 13 p.133, AR 57 pt.4 p.19, Maps P.871, 80597, P.2861
135	Ludgate Lake	Au	NMI 42A/8 Au 36, AR 57 pt.4, Maps P.871, 80597, P.2861
137	Michaud Porcupine	Au	NMI 42A/9 Au 47, MRC 13 p.133, AR 57 pt.4 p.22, MP132 p.421-430, Maps P.871, 80597, P.2861
138	Miller	Au	NMI 42A/8 Au 26, MRC 13 p.133, OFR 5467, AR 57 pt.4 p.23, MP 132 p.421-430, Maps P.871, 80597, P.2861
143	Bonnacord	Au	MDIR C0076, Maps P.822, 80587
154	Barlow-Dyer	Au	MDIR C0228, NMI 42A/9 Au 9, MRC 13 p.129, OFR 5467, AR 60 pt.9 p.38, Maps P.872, 80596
155	Gold Pyramid	Au	MDIR C0229, NMI 42A/9 Au 31, MRC 13 p.70, OFR 5467, AR 24 pt.1 p.181, AR 28 pt.2 p.24/53-54, AR 60 pt.9 p.45, AR 64 pt.1 p.14, Maps P.872, 80596
156	Big Pete	Au	MDIR C0230, NMI 42A/9 Au 16, MRC 13 p.129, OFR 5467, AR 60 pt.9 p.40, Maps P.872, 80596
157	Bonter	Au	MDIR C0227, NMI 42A/9 Au 10, MRC 13 p.129, OFR 5467, AR 60 pt.9 p.42, Maps P.872, 80596
158	Barrett	Au	NMI 42A/9 Au 14, MRC 13 p.129, AR 60 pt.9 p.40, Maps P.872, 80596
159	Caman	Au	NMI 42A/8 Au 16, MRC 13 p.129, OFR 5467, AR 60 pt.9 p.48, MP 132 p.421-430, Maps P.872, 80596, P.2861
160	Gui-por No. 4	Au	OFR 5467, AR 60 pt.9 p.50, Maps P.872, 80596, P.2861
162	Cominco	Au	OFR 5467, Maps P.872, 80596
163	Talisman	Au	MRC 13 p.71, OFR 5467, AR 60 pt.9 p.47, Maps P.872, 80596
167	Canadian Arrow	Au	NMI 42A/8 Au 29, MDIR C0224, MRC 13 p.73, OFR 5467, AR 46 pt.1 p.19, AR 48 pt.1 p.47, AR 65 pt.5 p.35, MP 107 p.109, MP 117 p.145, MP 130 p.218-224, MP 132 p.404-407, Maps P.832, OFM65, 80595, P.2860
168	Gunnar	Au	NMI 42A/8 Au 24, MDIR C0222, MRC 13 p.131, OFR 5467, AR 65 pt.5 p.38, Maps P.832, 80595, P.2860
169	Kelore	Au	NMI 42A/8 Au 32, MDIR C0226, MRC 13 p.75, OFR 5467, AR 49 pt.1 p.137-138, AR 50 pt.1 p.59, AR 60 pt.9 p.51, MP 119 p.291, AR 65 pt.5 p.45, Maps P.832, 80595, P.2860

TABLE 7.6: Continued

No.	Name	Commodity	Selected References
170	Ross	Au Ag	NMI 42A/8 Au 30, MDIR C0225, OFR 5467, MRC 13 p.76, pt.1 of AR 46 to AR 52, AR 55 pt.2, AR 60 pt.9, AR 64 pt.2, AR 65 pt.5, AR 67 pt.2, AR 69 to AR 73, MP 117 p.145, MP 132 p.413-420,Maps OFM65,P.2860
171	Vimy	Au	NMI 42A/8 Au 2, MDIR C0223, MRC 13 p.77, OFR 5467, AR 49 pt.1 p.25, AR 65 pt.5, Maps P.832, 80595, P.2860
172	Hislop Gold Mines	Au	NMI 42A/9 Au 14, MRC 13 p.74, OFR 5467, AR 28 pt.2 p.22/54-56, AR 47 pt.1 p.132, AR 60 pt.9 p.51, AR 65 pt.5 p.38, MP 132 p.421-430, Maps P.832, 80595, P.2860
173	Edross	Au	NMI 42A/8 Au 23, OFR 5467, MRC 13 p.131, AR 65 pt.5 p.37, Maps P.832, 80595, P.2860
174	Abuy Gold Mines	Au	NMI 42A/9 Au 8, MRC 13 p.131, OFR 5467, AR 65 pt.5 p.34, MP 132 p.421-430, Maps P.832, 80595
176	Martin-Bird	Au	MRC 13 p.131, AR 65 pt.5 p.47, Maps P.832, 80595
177	Weir	Au	AR 56 pt.5, Maps P.832, 80595, P.2860
178	Montclerg	Au	NMI 42A/10 Au 3, MDIR C0094, MRC 13 p.51, OFR 5467, MP 63 p.104-106, MP 132 p.404-407/408-412/421-430, Maps P.308, P.943, P.2335, OFM65, 80572
180	Scott	Ni	MDIR C0124, Maps P.308, P.943, P.2335, 80572
181	Alexo	asb Ni	NMI 42A/10 Ni 1 and asb 3, IMR 36 p.27, MRC 12 p.116, MRC 2, AR 46 pt.1 p.222-223, AR 18 pt.1, AR 20 pt.2, AR 24 pt.1, AR 26 pt.4, AR 27 pt.1, AR 28 pt.2, AR 40 pt.3, Maps P.308, P.943, P.2335, 80572
183	Clavos	Au	MDIR C0158, MRC 13 p.136, OFR 5467, NMI 42A/10 Au 16, MP 60 p.104, AR 40 pt.3, MP 132 p.404-407/408-412/421-430, Maps P.38, OFM65, 80582
184	St.Andrew Goldfields	Au	MDIR C0157, OFR 5467, NMI 42A/10 Au 14, MP 57 p.167-183, MP 60 p.103, MP 126 p.316-319, MP 119 p.291, MP 132 p.404-407/408-412/421-430, Maps P.38, OFM65, 80582
186	Seaway	Zn Pb	MDIR C0289, NMI 42A/7 Zn 1, MP 50 p.187, AR 40 pt.3, Maps P.161, P.2072, 80592
188	J.P. Roy	Au	MDIR C0236, MRC 13 p.136, OFR 5467, AR 49 pt.4, Maps P.2074, 80602
192	Egan	Fe	NMI 42A/7 Fe 1, MRC 11 p.112, Map 80603
193	Wilkie Mines	F,Au	NMI 42A/7, Map 80603
195	Mobb	Au Ag	GDIF, MDIR C0237, MRC 13 p.135, NMI 42A/8 Au 10, OFR 5467, AR 31 pt.7 p.20, MRC 7 p.21, Maps P.830, 80605, P.2860
200	Brett-Tretheway	Au	GDIF, OFR 5467, Maps P.827, 80607, P.2861
201	Bibis	Au	GDIF, MDIR C0213, OFR 5467, GR 165 p.51/57, Maps P.843, P.850, 80608
202	Garthack	Au	GDIF, MDIR C0238, MRC 13 p.136, OFR 5467, GR 165 p.58, AR 58 pt.4, AR 34 pt.6 p.98, AR 28 pt.2 p.51, Maps P.843, P.850, 80608
203	Hewitt	Au Cu	GDIF, MDIR C0212, OFR 5467, GR 165 p.51/57, Maps P.843, P.850, 80608

TABLE 7.6: Continued

No.	Name	Commodity	Selected References
204	Keevil	Au	GDIF, MDIR C0211, OFR 5467, GR 165 p.51/58, Maps P.843, P.850, 80608
206	Ghost Lake	Au	GDIF, MDIR C0210, OFR 5467, AR 34 pt.6 p.97, GR 165 p.51/58, Maps P.705, P.2288, 80609
207	Boulder	Au	NMI 32D/5 Au 5, MRC 13 p.127, AR 34 pt.6 p.97, Maps P.705, P.2288, 80609
208	A. White	Au	MDIR C0214, OFR 5467, GR 165 p.51/59-60, Maps P.706, 80610, P.2289
209	Magusi River	Cu	GDIF, MDIR C0215, NMI 32D/5 Cu 3, GR 165 p.51/60-61, Maps P.707, P.2285, 80611
210	Argus	Cu Zn	MDIR C0216, Maps P.103, P.857, 80573
212	Hollinger	Au Zn Cu	MDIR C0127, OFR 5467, Maps P.156, 80574
214	Nahanni WI-81-2	Au	OFR 5467, Maps P.156, 80574
215	Nananni WI-81-1	Au	OFR 5467, Maps P.156, 80574
216	Mattagami	Au	OFR 5467, Maps P.156, 80574
218	Pit	Au	MDIR C0132, OFR 5467, MP 132 p.392-397, Maps P.157 (marginal notes), P.852, OFM50, 80575
219	Shallow River	Au	OFR 5467, AR 28 pt.2 p.62, MP 132 p.392-397, Maps P.157 (marginal notes), P.852, OFM50, 80575
221	Noranda	Au	MDIR C0080, OFR 5467, MP 132 p.392-397, Maps P.775, OFM50, 80576
224	Jensen	Cu	MDIR C0179, Maps P.821, P.2431, P.2433, 80588
229	Claim Tp. 43	Au	MDIR C0106, MRC 13 p.123, AR 28 pt.2 p.33/53
230	Shaft Island	Au	MRC 13 p.123, AR 16 p.219
231	Canamax	Au	Maps P.797, P.2433, P.2432, 80600
232	East Zone	Au	MP 132 p.404-407/421-430, Maps P.797, P.2433, P.2432, OFM65, 80600
233	Bay Resources	Au	MP 132 p.392-397, Maps P.772, OFM50, 80577
235	Gelinas	Au	AR 65 pt.5, Maps P.832, 80595, P.2860
237	Bonwitha Mining Co.	Au	GDIF, Maps P.827, 80607, P.2861
240	Cortez Expl.Co.Ltd.	Au	GDIF, Maps P.843, P.850, 80608
241	Temple G.M. Ltd.	Au	GDIF, Maps P.830, 80605, P.2860
242	Tremblay, F.	Au	GDIF, Maps P.830, 80605, P.2860
243	Crossan, P.	Au	GDIF, Maps P.706, P.2289, 80610
244	McClosky, J.A.	Au	GDIF, Maps P.706, P.2289, 80610
245	Caramora Porc. M.L.	Au	GDIF, Maps P.2052, 80604, P.2860
247	Randa, T.	Au Ag	GDIF, MP 132 p.421-430, Maps P.705, P.2288, 80609
248	Lambroff Lucky Strik	Au	GDIF, Maps P.829, 80606, P.2861
250	New Kelore M.L.	Au Ag	GDIF, Maps P.829, 80606, P.2861
251	Pion, T.	Au	GDIF, Maps P.829, 80606, P.2861
252	St. Joe Canada Inc.	Au	GDIF, Maps P.829, 80606, P.2861
253	Trench	Au	AR 34 pt.6 p.94
254	Mickle	Ni	AR 24 pt.1 p.181, AR 28 pt.2 p.64, AR 56 pt.7 p.31, AR 60 pt.8 p.56-57, Maps P.866, 80586
255	Potter-Quinn	Au	AR 28 pt.2 p.63
256	lot 4, con.1	Au	Map P.157 (marginal notes)
257	Hedman Mines Copper	Cu Ni	MRC 12 p.125-126, AR 60 pt.8 p.40-43, Maps P.775, 80576
258	Condaka	Au	Maps P.706, P.2289, 80610
259	Shoot Zone	Au	GDIF, MP 57 p.172, Maps P.39, 80583
260	Porphyry Zone	Au	GDIF, MP 57 p.172, Maps P.39, 80583
261	Hollinger	Au	Maps P.832, 80595, P.2861
263	Belore	Au	assessment files
281	Yellow Sands	Au	assessment files

TABLE 7.6: Continued

No.	Name	Commodity	Selected References

Abbreviations:
AR - OBM or ODM Annual Report
GDIF - OGS Township Geological Data Inventory Folio
GR - ODM or OGS Geological or Geoscience Report
IMR - ODM or OGS Industrial Mineral Report
MDIR - OGS Mineral Deposit Inventory Record
Map - OBM or ODM or OGS Map
MDC - OGS Mineral Deposit Circular
MP - OGS Miscellaneous Paper
MRC - ODM Mineral Resource Circular
NMI - Federal National Mineral Inventory
OFR - ODM or OGS Open File Report
SMDR - OGS Source Mineral Deposit Record

Follow-up sampling and ground geophysical surveys are planned.

Golden Shield Resources Limited diamond drilled five holes and conducted geophysical surveys in Guibord Township.

Goldpost Resources Incorporated has begun exploration work, including the excavation of a decline ramp on its Gibson West Zone in Hislop Township. Goldpost also expected to begin underground exploration on the New Kelore Property, also in Hislop Township, where a 450-foot (137 m) shaft and extensive lateral development work on four levels were previously completed by Hollinger Mines Limited. Previous operators outlined 318 000 tons to the 450-foot level grading better than 0.18 ounce gold per ton (The Northern Miner, August 18, 1986). Surface drilling is also planned on the Kelore South Zone on the same property.

Hedman Resources Limited continued to produce hedmanite (lizardite serpentine mineral used as an asbestos substitute, The Northern Miner, April 28,1986, p.14) from its open pit mine in Warden Township. The ore is trucked about 26 miles to a 600-ton per day crusher house and a 300-ton per day mill facility in Matheson where a dry milling process is used to produce the final lizardite serpentine powder product. Hedman Resources currently produce about 4000 to 5000 tons per year of product, with the mine and mill currently operating at about 10 percent of rated capacity.

Kidd Creek Mines Limited conducted geophysical surveys in Michaud Township and diamond drilled seven holes on separate claim groups in Wilkie Township.

Lac Minerals Limited conducted magnetic surveys over claim groups in Elliott, Garrison, and Tannahill Townships.

Maude Lake Gold Mines Limited conducted induced polarization surveying and a 15-hole overburden drilling program in Beatty Township and has a 14-hole overburden drilling program in Carr and Wilkie Townships.

Newmont Exploration of Canada Limited optioned, from Teddy Bear Valley Mines Limited and Lightval Mines Limited, two patented claim groups in Harker and Holloway Townships, and began compilation, geophysical surveying, and whole-rock geochemical sampling on the properties.

New Strategic Metals Incorporated has entered into an agreement with Silverhawk Resources Limited to earn a 25 percent interest in the Golden Harker Deposit, which is part of a claim block located in Harker, Holloway, and Elliott Townships. The property is currently held jointly by Silverhawk and Lenora Explorations Limited and is under option from Golden Harker Explorations Limited and Nelson Harley. A surface program, with Lenora as operator, consisting of induced polarization and magnetic surveys and 6000 feet (1830 m) of diamond drilling was scheduled to begin in October, 1986. Magnetic and geochemical surveys were performed in Elliott Township. Reserves of 103 000 tons grading 0.25 ounce gold per ton at the Golden Harker Deposit were outlined previously (The Northern Miner, July 25, 1985).

Noranda Exploration Company Limited conducted geophysical and/or geological surveys over claim groups in Bowman, Frecheville, and Guibord Townships.

Pacific Coast Mines diamond drilled two holes totaling 1200 feet on the Jascan Resources Incorporated 6-claim property (along the Porcupine-Destor Fault Zone) in Guibord Township.

Perrex Resources Incorporated conducted programs of induced polarization surveying, overburden reverse circulation drilling, and bedrock diamond drilling on its claim group in Harker and Elliott Townships.

Mining operations continued at the Ross Mine by Pamour Mines Incorporated in Hislop Township, where mining has been taking place continuously since 1936. The mine is expected to produce its one-millionth ounce of gold within the next year (Troop 1986).

St. Andrew Goldfields Limited, Esso Minerals Canada Limited, and Quebec Sturgeon River Mines Limited collectively hold properties which cover, more or less continuously, a 12-mile (19 km) stretch of the Porcupine-Destor Fault Zone in Stock, Taylor, and Carr Townships (The Northern Miner, February 3, 1986). On St. Andrew's main property in Stock Township, the main mineralized zones have estimated combined reserves of 735 600 tons grading 0.135 ounce gold per ton (The Northern Miner, June 26, 1986). In 1986, exploratory underground diamond drilling on this property discovered the pyritic North 2 Zone, the tested area of which is believed to contain 500 000 to 600 000 tons at an average but cut grade of 0.25 ounce gold per ton (Quebec Sturgeon River Mines Limited's interim report for the six-month period ending June 30, 1986). The North 2 zone is described to be steeply dipping and to consist of vein-type mineralization with about 95 percent of the gold contained within pyrite (The Northern Miner, June 9, 1986). Exploratory drilling in 1986 also led to the discovery of another mineralized zone, the East Zone, which is located off the St. Andrew Goldfields main property, on ground controlled 75 percent by St. Andrew and 25 percent by Esso Minerals (The Northern Miner, May 26, 1986).

In Taylor Township, St. Andrew Goldfields (operator) and Esso Minerals Canada began sinking a 565-foot (171 m) 3-compartment shaft as part of a program planned to include 1300 feet (395 m) of drifting on two levels and 5000 feet (1525 m) of underground drilling on the Porphyry Zone. The program is focused on the Porcupine-Destor Fault Zone and is anticipated to cost $4.5 million. The "Shoot Zone" (also in Taylor Township and along the Porcupine-Destor Fault Zone) has drill-indicated reserves estimated to be 1.09 million tons with an undiluted and uncut grade of 0.126 ounce gold per ton. This deposit is jointly owned by St. Andrew Goldfields and Esso Minerals Canada (Quebec Sturgeon River Mines Limited, interim report for the six month period ending June 30, 1986).

St. Joe Canada Incorporated conducted magnetic surveys over claims in Barnet, Cook, Guibord, and Michaud Townships, and a geological survey in Frecheville Township.

Silverside Resources Incorporated diamond drilled on the Buffonta Property in Garrison Township, which was recently optioned from Kerr Addison Mines Limited. Silverside discovered a new mineralized zone in a previously undrilled area about 80 feet (24 m) north of Zone 6 (comprising 40 000 tons grading 0.24 ounce gold per ton and which is reported to be open pitable (The Northern Miner, November 17, 1986). Kerr Addison Mines Limited mined about 64 000 tons of ore from the Murphy Pit (also on the property) in 1981 which averaged 0.138 ounce gold per ton (The Northern Miner, March 29, 1984).

Vanstates Resources Limited diamond drilled several isolated targets on its Telgar Property in Thackeray Township during the latter part of 1986. The property was formerly held by Cominco Limited (George Cross Newsletter, August 5, 1986).

PROPERTY VISITS

The numbers in parentheses after the name correspond to the numbered locations on Figure 7.1.

R. ANNETT AND R. FERGUSON BARITE OCCURRENCES (1), STULL TOWNSHIP

This occurrence, 3.2 km north of Veilleux lumber camp (being dismantled), was discovered by Roy Annett and Ralph Ferguson. South 0.3 km from the Veilleux main lumber haulage road culvert in a creek, at its junction with the Wanapitei River, and west of the road, is a small exposure of a reddish granophyre dike cutting Nipissing Diabase. Veins cutting the granophyre contain fragments of granophyre and a matrix of barite, a white lightweight soft vitreous mineral (gypsum?), and malachite along fractures.

North 0.3 km from the above mentioned creek culvert (0.6 km north of the above-mentioned barite occurrence) is a small exposure of similar material. Host rock granophyre is cut by veins less than 0.5 m wide that contain barite, gypsum, chalcopyrite, malachite, and inclusions of wall rock granophyre. The host rock is 10 percent mafic minerals, hematite-stained, igneous-textured (not Lorrain Formation redbeds) granophyre.

A series of these barite-bearing veins cutting a granophyric differentiate of Nipissing Diabase occurs along a Nipissing Diabase basin rim in Stull Township from the Wanapitei River-Sylvester Creek junction north for about 1 km. The entire area of barite occurrences extends sporadically for 20 km from North Williams through Dufferin and Stull Townships to Welcome Lake in Valin Township. The barite veins cut Nipissing Diabase and Lorrain Formation feldspathic sandstone. Barite is also disseminated in sandstone that occurs near areas of sandstone containing disseminated chalcopyrite and gypsum.

BELORE GOLD PROSPECT (2), McCOOL TOWNSHIP

Rock types present are komatiites and magnesian to iron-rich tholeiites. Some are altered, particularly in their basal portions, by the absorption of the underlying sedimentary rocks which contain carbonate, sericite, silica, and pyrite. Present also are relatively unaltered interflow sedimentary rocks such as chert, siltstone, and barren sulphide types. All rock types are cut by bimodal (large and small phenocrysts) porphyry, syenite, and quartz veins. A porphyry "plug" and foliated mylonitized fault breccia are found on the property. Gold occurs in greenish grey rock containing disseminated pyrite, sericite, and carbonate, and, in places, is concentrated in areas of numerous quartz veins and fractures.

C.W. BRUNET COPPER–GOLD PROSPECT (3), MacMURCHY TOWNSHIP

An east-trending zone, several metres wide, of quartz veins and silicification, cuts red rhyolite, which has a cherty or silicified appearance, and trachytic porphyry that occurs near the top of the older mafic to felsic sequence in the Shining Tree area. The youngest rock is a cross-cutting Matachewan Diabase dike. The mineralized zone contains chalcopyrite, bornite, and specular hematite, and in places is stained by malachite. Jack Willars (consultant geologist, New Liskeard, personal communication, 1981) obtained a grade of 6.9 percent copper for a suite chip sampled across more than 1 m of quartz veined red rhyolite. According to C.W. Brunet (prospector, Shining Tree, personal communication, 1986) a grab sample from this zone yielded 0.025 ounce gold per ton (0.86 g/t). Fractures in the walls of the red rock contain sericite, and angular sericitic chips are present in parts of the rock itself. Down slope, near the West Montreal River, the rock is "porphyry" containing white feldspar phenocrysts, less than 5 mm long, disseminated throughout the matrix.

LAST CHANCE SYNDICATE COBALT OCCURRENCE (4), UNWIN TOWNSHIP

The main pit exposes narrow calcite-red feldspar veins cutting Nipissing Diabase and cutting the patchy pegmatitic rock transitional (15 percent hornblende) to the granophyric late differentiate of the diabase. The veins are composed mainly of calcite, and contain cobalt arsenide and chalcopyrite, and are stained in places with cobalt bloom. According to Roy Annett (prospector, Shining Tree, personal communication, 1986) material from here yielded silver assays. The cobalt arsenide-chalcopyrite-cobalt bloom-malachite mineralization is exposed in several places along the eastern side of a diabase bluff, south of an oxbow pond cut off from the Wanapitei River, and also one claim-length (400 m) farther west (on the other side of this north-trending diabase ridge). According to Ralph Ferguson (prospector, Matachewan, personal communication, 1986), in the early days prospectors bagged and shipped this type of mineralization from a prospect in Leask, the township south of Unwin.

MIRADO NICKEL MINES LIMITED (5), CATHARINE AND McELROY TOWNSHIPS

Carbonate-sericite-Cr muscovite-feldspar-pyrite sedimentary components, incorporated into the base of overlying flows, contain gold. A few gold-bearing quartz veins cut this altered and unaltered mafic volcanic rock. In addition, gold is present in the matrix of breccia and tuff containing fragments most of which are mafic, "porphyry", broken beds of deformed fine-grained pale greenish grey mudstone, and white chert. Some fragments of chert are zoned concentrically, perhaps indicative of a hot spring environment.

The matrix is mostly felsic (i.e. quartz and sericite). Other fragments are composed of sulphide minerals, and some rock fragments have rims replaced by sulphide mineralization. Most fragments are angular. Where chalcopyrite is present, gold is concentrated. Most pyrite is medium grained, but contains gold, perhaps mainly in the lesser percentage of pyrite that is fine grained and disseminated. The medium-grained pyrite occurs as lenses and fracture-filling veins. Quartz-carbonate and carbonate veins are white, average 1 cm wide, and contain 1 to 3 percent pyrite. Some Cr muscovite occurs along walls of the carbonate stringers.

Near diorite and quartz monzonite intrusions, fine-grained silicified rock, about 15 cm thick and displaying very little internal texture, contains 1 to 4 percent pyrite and about 1/4 ounce gold per ton (about 8 g/t). The footwall is fragmental and the hanging wall massive. Several lenses of ore-grade exist, some of which have a maximum thickness of 10 m and maximum strike length of 100 m. Several of these lenses are open at depth down plunge.

NEWFIELDS MINERALS INCORPORATED "KIRKLAND BASIN" (6), TECK TOWNSHIP

Newfields' extensive diamond drilling of the Kirkland Lake "North Break" has intersected several rock types not identified correctly on any existing geological map of the geographic township of Teck. Alkalic rocks, all designated as intrusive rocks on the maps, encompass a variety of rock types. Amongst these are arkose or feldspathic sandstone, trachyte flows, debris flows, glowing avalanche deposits, mafic to intermediate tuffs (some subaerial, some welded), some of the banding which is mainly metamorphic foliation with some feldspars stretched. Most of the metamorphic effects (foliation, mylonitization, and recrystallization) and metasomatism (wall rock alteration and quartz veining) may be caused by forceful injection of alkalic intrusive rocks. The metasomatism manifests itself in places as wall rock sericite with medium-grained pyrite, and as quartz veins containing fine-grained pyrite in fractures. "Bimodal" porphyry intrusive (white and brown anhedral to euhedral phenocrysts) is coloured pale greenish yellow where sericite is prevalent, and elsewhere typically is hematitized to a red colour. Sericite-chlorite-white feldspar lamprophyric rock is a hybrid typically generated from intrusive porphyry contaminated by "greenstone" country rocks.

ONITAP COBALT–SILVER–GOLD OCCURRENCES (7), UNWIN TOWNSHIP

Gold, a rare constituent of Cobalt-Gowganda area silver occurrences, has been detected in otherwise similar occurrences in two areas of Unwin Township. One such area is along 3 km of a Nipissing Diabase "basin" rim from Saturday Lake to the Wanapitei River. Here, Cobalt-type silver-bearing veins cutting Nipissing Granophyre contain gold. One particular occurrence is east of the southwestern corner of White Lake, about 10 m up slope from the high water mark. A pit here is in Nipissing Diabase that is cut by red granophyre veinlets and by carbonate veins containing cobalt arsenide and cobalt bloom; epidote is in the wall rocks. Also present is a mineralized quartz vein 3 cm wide. The granophyre contains 5 to 10 percent of a dark (mafic) mineral. Several similar occurrences are present from this pit along a distance of about 2-claim lengths (800 m) north to Saturday Lake's southern shore.

The assay of "cobaltite-niccolite" samples from here yielded 0.05 ounce gold per ton (1.7 g/t) and 0.01 ounce gold per ton (0.34 g/t) according to Peter Born, November, 1981, in a report to Patino Mines (Quebec) Limited available in the Assessment Files, Resident Geologist Office, Kirkland Lake.

FERN AND PHIL RIVARD AND LASSE RAITANEN (8), EBY TOWNSHIP

Diamond drill intersections and stripping of soil across the stratigraphy in concession IV, lot 2, reveal the Skead-Larder Lake-Piche Groups section as described both along Larder Lake-Englehart Highway 624 and at its deeper-water equivalent through Adams Iron Mine (Jensen 1978, p.239-244). Rock types present are of polymictic conglomerate (matrix-supported clasts possibly deposited on a river bed and also clast-supported possibly lag concentrated on a beach), feldspathic chert, sulphide and magnetite iron formation, talc-chlorite schist sedimentary rocks (typically derived from eroding komatiite), chlorite-feldspar-carbonate-sericite sedimentary rock; spinifex-textured talc-chlorite komatiite flows, pillow-topped tholeiitic basalt; intrusive "pebble" (inclusions that underwent varying degrees of digestion and originate from several different rock types), lamprophyre, augite syenite, the Kirkland Lake gold mines type of syenite porphyry, and syenite-metasomatized (hematitized reddened) equivalents of some of the other rock types. Some chert is recrystallized to sand-size metacrysts of quartz. Pebbles present in the conglomerate are quartz, Skead Group whitish medium-grained "rhyolite" or quartz-feldspar porphyry and feldspar porphyry, dark chloritic basalt, lithic fragments broken from beds, chert, massive sulphide mineralization, mudstone, etc.

RECOMMENDATIONS FOR EXPLORATION

BASAL TILL SAMPLING

Rota-sonic overburden drilling by the Ontario Government's Operation Black River-Matheson is establishing the soil stratigraphy to control subsequent follow-up by exploration organizations using the less expensive reverse circulation overburden drilling. Rota-sonic drilling provides the soil section in the form of reasonably intact core, in contrast to being washed up to surface as during reverse circulation drilling, and cores 1 to 2 m into solid bedrock. Black River-Matheson area till contains Paleozoic Lowlands limestone clasts advanced from 330°, 350°, and 020°; till from 060° (Quebec) contains no limestone.

Ice, estimated to have been almost 2 km thick, scraped free of soil the stoss side of bedrock topographic highs, and debris in the ice moved up the soil section via shears. During glacial advances, lodgement till was plastered at the base of ice, up-ice from bedrock whalebacks. Melt-out till fell down, loosely compacted, down-ice from the lee side of bedrock topographic highs. Eighty percent of lodgement till is from nearby to a maximum of 1 km away. Till can be recognized because no little lenses of gravel are present, although melt-out till can have sand-sized grains that are rounded.

The matrix of most till is about 60% sand, 30% silt, and 10% clay.

MUNRO ESKER SAMPLING

The Lebel Township gravel pit, south of Highway 66 opposite the Esker Park-Harker-Holloway road, is the site of the first documented discovery in Ontario of large (greater than 0.5 m diameter) boulders of kimberlite. In glacial conditions, kimberlite can survive some transport. As can be seen in this pit, most Kirkland Lake area gravel pits are ice-walled channel deposits. These pits are not actual eskers such as in Esker Lakes Provincial Park upstream to the north, where genuine eskers were deposited in tunnels at the base of the ice. This ice-walled channel material was deposited subaerially, not in braided channel river deposits that contain much silt. Gilbert Deltas here have subaqueous bottomsets and foresets and subaerial topsets.

Heavy minerals detritus has concentrated typically in the matrix of the gravel on the lee side of a pebble, which is the quiet backwater site of deposition of heavy minerals that deposited simultaneously with the pebble. Where the deposition mechanism is lag concentrate (e.g. on an ancient beach), the heavy minerals dropped down between underlying pebbles when the matrix light minerals and some of the fines were being removed by wave action.

LOCATIONS OF GOLD MINES AND ARCHEAN CONGLOMERATES AND WACKES IN THE RESIDENT GEOLOGIST AREA

On the Biroco Prospect optioned by Canadian Nickel Company Limited (Canico) in Lebel Township near the Gauthier Township boundary, Larder Lake Group conglomerate is exposed by stripping, a short distance north of Timiskaming Group conglomerate. Figure 7.5 shows the distribution of known conglomerates and wackes and gold mines in the Kirkland Lake Resident Geologist area; conglomerates deposited in deltas or beaches are not singled out because this Archean sedimentological information has never been placed on maps.

Unlike the situation which pertains at Timmins, government geological maps of the Kirkland Lake-Larder Lake area do not distinguish between the two main ages of Archean sedimentary rocks, lumping Larder Lake Group (about 2710 Ma) and Timiskaming Group (about 2690 Ma). Current terminology is that the Timiskaming Group is distributed generally north from the Larder Lake Fault (which occurs roughly along the north-facing Larder Lake-Skead Groups' protocontinental slope, which is composed mainly of distal sediments) and the Larder Lake Group is exposed on surface to the south of the Larder Lake Fault. However, in a few places on surface in Lebel, McVittie, Hearst, and Teck Townships, parts of the Timiskaming Group are south of parts of the Larder Lake Group, whether as outliers, or folded or fault wedged in. The Larder Lake Group's ("Kerr Group" part) most distal conglomerate might well be formed from the most seaward deltas, which generally contain the northernmost conglomerates. The northernmost known Larder Lake Group and/or underlying Skead Group are near the largest gold deposits known in the Kirkland Lake-Larder Lake area, (i.e. Kirkland Lake, Upper Canada, Omega and Kerr Addison). The situation may be comparable in the Black River-Matheson project area (and elsewhere), where mines are few, presumably partly because the Great Clay Belt overburden obscures the bedrock and masks anomalies and such stratigraphic clues that

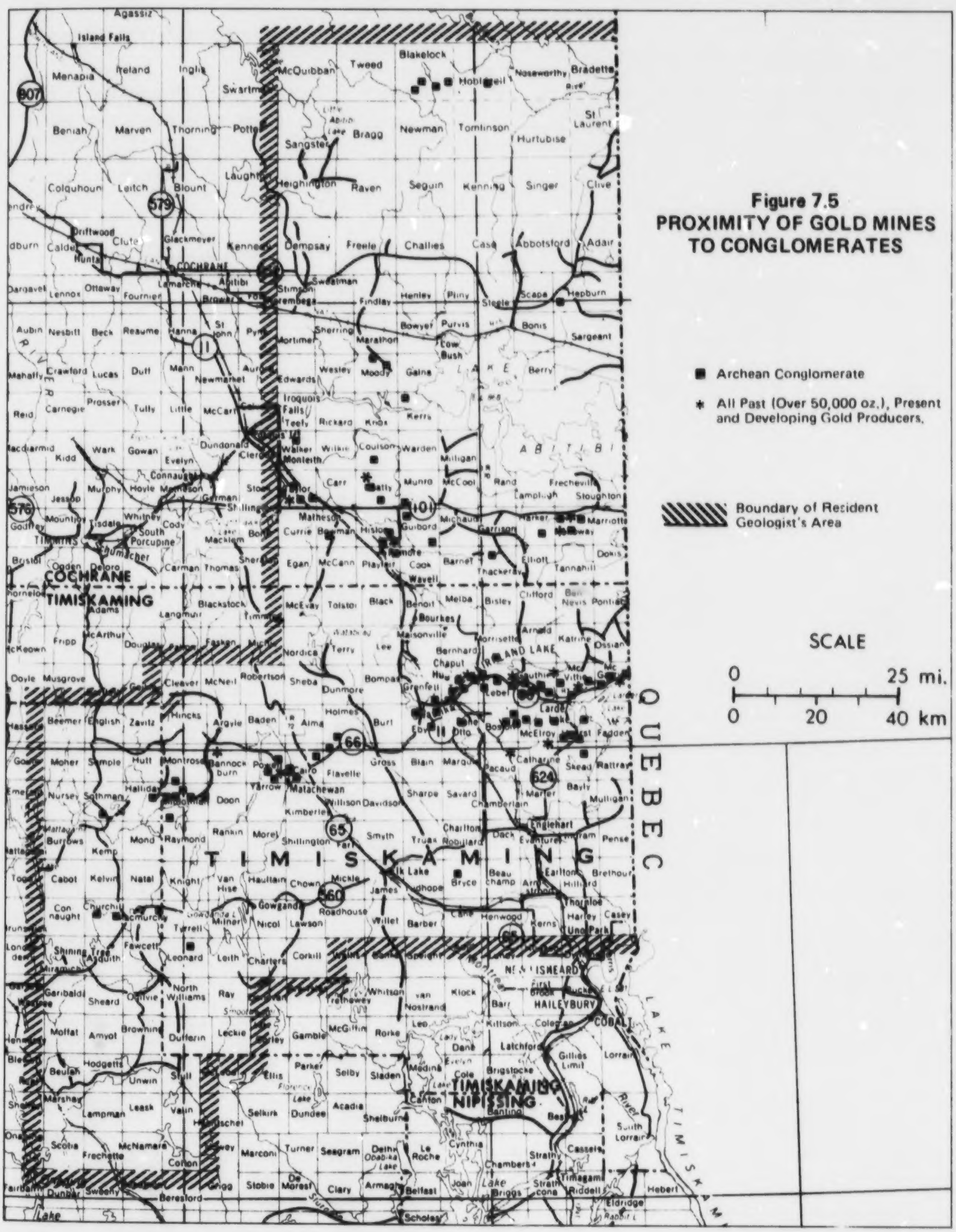

Figure 7.5
PROXIMITY OF GOLD MINES TO CONGLOMERATES

■ Archean Conglomerate
* All Past (Over 50,000 oz.), Present and Developing Gold Producers.
▨ Boundary of Resident Geologist's Area
SCALE
0 25 mi.
0 20 40 km
QUEBEC
TIMISKAMING
COCHRANE
TIMISKAMING
TIMISKAMING
NIPISSING
ABITIBI
LAKE
Agassiz
Island Falls
Menapia
Ireland
Inglis
Swartman
McQuibban
Tweed
Blakelock
Hoblitzell
Noseworthy
Bradette
Beniah
Marven
Thorning
Potter
Sangster
Bragg
Newman
Tomlinson
Hurtubise
St Laurent
Colquhoun
Leitch
Blount
Laughton
Heighington
Raven
Seguin
Kenning
Singer
Clive
Driftwood
Clute
Glackmeyer
Kennedy
Dempsay
Freele
Challies
Case
Abbotsford
Adair
COCHRANE
Lamarche
Abitibi
Stimson
Sweatman
Dargavel
Lennox
Ottaway
Fournier
Brower
Colquhoun
Findlay
Henley
Pliny
Steele
Scapa
Hepburn
Aubin
Nesbitt
Beck
Reaume
Hanna
St John
Pyne
Mortimer
Sherring
Marathon
Bowyer
Purvis
Cow Bush
Bonis
Sargeant
Mahaffy
Crawford
Lucas
Duff
Mann
Newmarket
Aurora
Edwards
Wesley
Moody
Gaina
Berry
Reid
Carnegie
Prosser
Tully
Little
McCart
Iroquois Falls
Teefy
Rickard
Knox
Kerrs
Macdiarmid
Kidd
Wark
Gowan
Evelyn
Dundonald
Clergue
Walker
Monteith
Wilkie
Coulson
Warden
Milligan
Connaught
Carr
Munro
McCool
Rand
Frecheville
Jamieson
Jessop
Murphy
Hoyle
Matheson
German
Stock
Beatty
Lamplugh
Stoughton
Mountjoy
Tisdale
Whitney
Cody
Shillington
Currie
Bowman
Hislop
Guibord
Michaud
Garrison
Harker
Holloway
Marriott
TIMMINS
South Porcupine
Macklem
Bond
Ramore
Dokis
Bristol
Ogden
Deloro
Schumacher
Carman
Thomas
Sheraton
Egan
McCann
Playfair
Cook
Barnet
Thackeray
Elliott
Tannahill
Wavell
Adams
Langmuir
Blackstock
Timmins
McEvay
Tolstoi
Black
Benoit
Melba
Bisley
Clifford
Ben Nevis
Pontiac
Fripp
McArthur
Douglas
Fasken
Midlothian
Bourkes
Arnold
McKeown
Nordica
Terry
Lee
Maisonville
Morrisette
Katrine
Ossian
Bernhardt
Chaput Hughes
KIRKLAND LAKE
Doyle
Musgrove
Cleaver
McNeil
Robertson
Sheba
Dunmore
Bompas
Grenfell
Lebel
Gauthier
McVittie
Hincks
Argyle
Baden
Alma
Holmes
Burt
Larder
Hassard
Beemer
English
Zavitz
Ebbs
Otto
Boston
McElroy
Fadden
Gomme
Moher
Semple
Hutt
Montrose
Bannockburn
Powell
Cairo
Flavelle
Gross
Blain
Marquis
Pacaud
Catharine
Skead
Rattray
Emerald
Nursey
Sothman
Halliday
Doon
Yarrow
Matachewan
Willison
Davidson
Sharpe
Savard
Chamberlain
Marter
Bayly
Mulligan
Burrows
Kemp
Mond
Raymond
Kimberley
Rankin
Morel
Shillington
Smyth
Truax
Robillard
Charlton
Dack
Evanturel
Englehart
Ingram
Pense
Tooms
Cabot
Kelvin
Natal
Knight
Van Hise
Haultain
Chown
Mickle
Elk Lake
James
Tudhope
Bryce
Beauchamp
Armstrong
Earlton
Hilliard
Brethour
Con naught
Churchill
Macmurchy
Tyrrell
Gowganda
Milner
Nicol
Lawson
Roadhouse
Willet
Barber
Henwood
Kerns
Thornloe
Harley
Casey
Uno Park
Shining Tree
Fawcett
Asquith
Leonard
Leith
Charters
Corkill
NEW LISKEARD
Garibaldi
Sheard
Ogilvie
North Williams
Ray
Trethewey
Whitson
van Nostrand
Klock
Barr
HAILEYBURY
Moffat
Amyot
Browning
Dufferin
Leckie
Gamble
McGiffin
Rorke
Leo
Kittson
Coleman
COBALT
Dane
Latchford
Gillies Limit
Lorrain
Hodgetts
Beulah
Unwin
Scadding
Ellis
Parker
Selby
Sladen
Medina
Cole
Brigstocke
Marshay
Leask
Lampman
Selkirk
Dundee
Acadia
Shelburne
Canton
Banting
Bucke
South Lorrain
Scotia
McNamara
Frechette
Corbett
Marconi
Turner
Seagram
Delhi
Le Roche
Cynthia
Strathy
Cassels
Chambers
Stobie
De Morest
Clary
Armagh
Belfast
Joan
Briggs
Strathcona
Timagami
Riddell
Hebert
Eldridge
Beresford
Scholes
Lake Timiskaming
River
807
579
11
576
101
66
65
560
624

indicate proximity to gold deposits, (e.g. deltaic and beach conglomerates).

TABLE 7.7: MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING 1986 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Preliminary Maps

P.2842
P.2958
P.2983
P.2986
P.3048
P.3052
P.3053

Geophys/Geochem Maps

80759
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Coloured Map

2501

Open File Maps

OFM 48
OFM 50
OFM 65

Studies

Study 28
Study 55

Open File Reports

OFR 5541
OFR 5569
OFR 5572
OFR 5573
OFR 5574
OFR 5592
OFR 5593
OFR 5608
OFR 5609
OFR 5610
OFR 5611
OFR 5612
OFR 5613
OFR 5614
OFR 5615
OFR 5618
OFR 5622
OFR 5625
OFR 5628

Miscellaneous Reports

MP 77
MP 128
MP 129
MP 130
MP 131
MP 132

Geological Data Inventory Folios

GDIF 266
GDIF 272

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

A list of maps and reports, pertaining to the Kirkland Lake Resident Geologist area, that were issued by the Ontario Geological Survey during 1986, are found in Table 7.7. A histogram of the numbers of inquiries received at the Kirkland Lake Resident Geologist's Office from 1970 to 1986 is shown in Figure 7.6.

ENGINEERING AND TERRAIN GEOLOGY SECTION

P.F. Finamore mapped the Quaternary geology of the Shining Tree area.

This project is part of the Canada-Ontario Mineral Agreement (COMDA), which is a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario.

MINERAL DEPOSITS SECTION

R.J. Rice studied the regional sedimentology of the Lorrain Formation in the Northern Cobalt Embayment to facilitate a thorough evaluation of its paleoplacer gold potential. This project is part of COMDA (Canada-Ontario Mineral Agreement).

INTERDISCIPLINARY PROGRAMS

The following programs are part of Operation Black River-Matheson (BRIM), funded equally by the Ontario Ministry of Natural Resources and the Ontario Ministry of Northern Development and Mines, a multiyear geoscience program which covers a 40 township block straddling Highway 101 east of Timmins (Night Hawk Lake) to the Ontario/Quebec border. The objectives of this program are to provide a comprehensive and integrated geoscience database; to develop a regional stratigraphic and metallogenetic framework; and to promote new mineral exploration strategies and development in the BRIM area.

K.W. Christian carried out a sedimentological investigation of a segment of the Munro Esker complex in Gauthier Township in order to develop a detailed sedimentological model explaining the genesis of local glaciofluvial deposits.

R. Johnstone continued mapping in Coulson, Warden, and Milligan Townships as part of a program to carry out detailed, synoptic and stratigraphic mapping along the Destor-Porcupine Fault from east of Timmins to the Quebec border.

K.G. Steele, C.L. Baker, and M.B. McClenaghan continued the reconnaissance till sampling program in the Matheson-Lake Abitibi area. Thirteen sites on Lake Abitibi, six exposures on McDiarimid Lake, and two hand-dug pits on Webster Lake, were described and sampled. A winter drill program started in January, 1987.

D.G. Troop studied the multiple orebody types and vein morphologies at the Ross Mine.

P.J. Whittaker continued gold metallogenetic studies of the Pipestone and Destor-Porcupine deformation zones and associated structures.

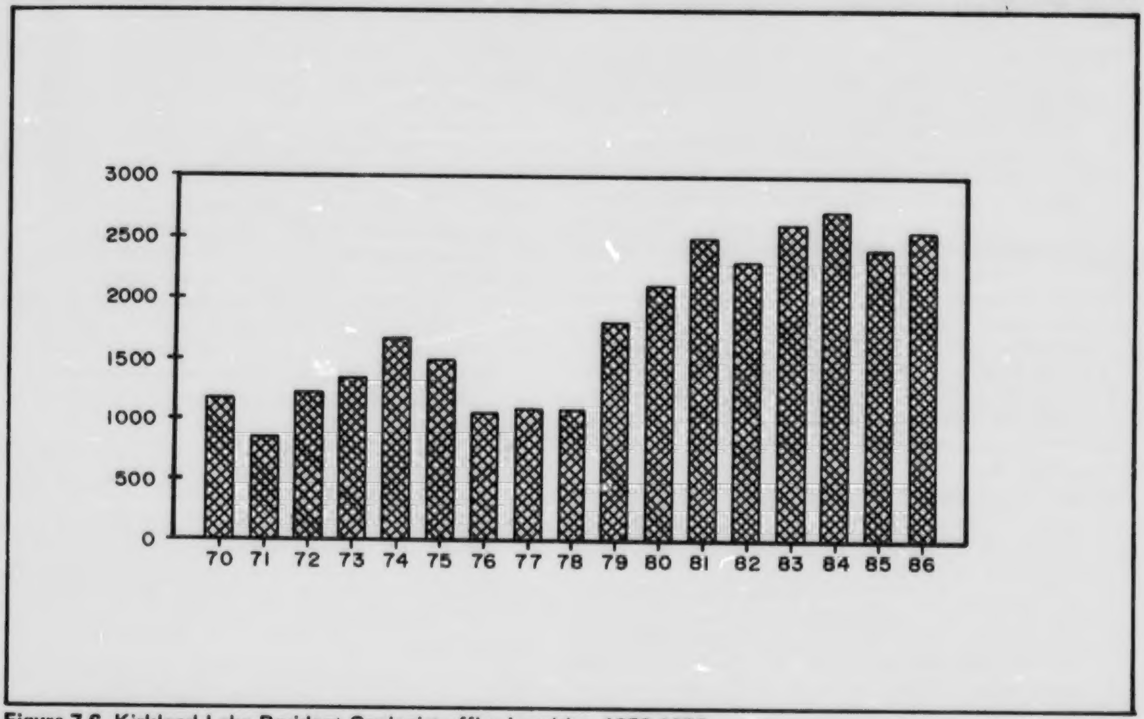

Figure 7.6. Kirkland Lake Resident Geologist office inquiries, 1970-1986.

RESEARCH BY OTHER AGENCIES

GEOSCIENCE RESEARCH GRANT PROGRAM

Queen's University

I. Nicol and G.S. Shelp

Grant 192: Geochemical Exploration for Gold.

D.J. Toogood and C.J. Hodgson

Grant 227: Relationship Between Gold Deposits and The Tectonic Frame Work of the Abitibi Greenstone Belt in the Kirkland Lake-Larder Lake Area.

University of Toronto

J.D. Redman, S.K. Zhao, and D.W.S. Strangway

Grant 260: Magnetotelluric Mapping of the Destor-Porcupine Fault.

G.C. Wilson and J.C. Rucklidge

Grant 262: Lithological Features and Economic Significance of Reduced Carbonaceous Rocks in Gold Deposits.

University of Western Ontario

N.D. MacRae and H.W. Nesbitt

Grant 269: Compositional Characteristics of Pyrite in Barren and Gold Mineralized Veins.

EXPLORATION TECHNOLOGY DEVELOPMENT FUND

C.F. Gleeson and Associates Limited, and Terrain Analysis and Mapping Services Limited

C.F. Gleeson, R.O. Thomas, V.N. Rampton, S. Paradis, and S.G. Carden

Grant 097: Gold in Peat and its Relevance to Mineral Exploration.

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8. Cobalt Resident Geologist's Area, Northeastern Region

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INTRODUCTION

Although silver prices remained at depressed levels in 1986, exploration for the metal increased markedly from the previous year. A rebound in gold prices and speculative increases in the price of platinum resulted in a significant renewed interest in the Temagami greenstone belt, where numerous known occurrences of these metals are located. Exploration for and development of industrial minerals increased at an ever-expanding rate. Interest was also expressed during the year in exploration for silica and diamonds. Although exploration increased to the highest levels recorded for this decade, production activities suffered dramatically because of the destruction of the Agnico-Eagle Mines Limited silver mill early in the year. Although other commodities produced in the area showed appreciable gains from last year, silver production fell to its lowest level ever. However, with the construction of a new mill, scheduled for completion in the spring of 1987, it is estimated that total tonnage and value of all mineral commodities produced in this area over the next two years will increase dramatically.

Some of the more significant developments in the Cobalt camp include the recent discovery of a new silver vein zone southeast of the Langis Mine by Agnico-Eagle Mines Limited; discovery of new, wide intersections of gold-bearing rocks by Lacana Mining Corporation and Stroud Resources Ltd. at Arsenic Lake, in Strathy Township; the rapid expansion of the Dymond Clay Products limestone quarry in Bucke Township; the continuing development of the Hellens-Eplett Mining Incorporated silver prospect in Lorrain Township and the building of a new 300 ton per day mill by Agnico-Eagle Mines Limited.

The only real negative influence is the continuing restriction on claim staking over much of the area due to a long-standing land claim by the Temagami Indian Band. Although the Ontario Provincial Government offered a settlement proposal during the year, it was rebuffed and a counterproposal submitted. No further action has yet been publicized. This claim has effectively stifled exploration during the past decade.

The many research projects initiated in the past few years are continuing and several new projects are nearing completion. They are described in more detail in the following sections. These projects are aimed at expanding the local economic base and providing new data to assist in finding and developing new commodities and at expanding our knowledge of the geology and ore forming processes in the camp.

RESIDENT GEOLOGIST'S ACTIVITIES

During the year, the Cobalt office was staffed by Leo Owsiacki, Resident Geologist; K. Larabie, Secretary; Contract Geologists including P. Anderson, W.T. Grant, E.M. Dodd, M.C. Smyk, S. Walker; L. Francis, Draftsman; Geological Assistants including M. Gabbani, A. Marvin, D. Irwin; T. Beairsto, Experience '86 student; P. Kirky, Futures Student; and Manual Labourers J.G. Pinet, K. Moore, D. Galliot, and M. Keon.

The compilation and publication of Geological Data Inventory Folios was continued during the year. Eleven (11) folios were completed and published in 1986. In the past three and one half years, GDIF's for a total of 59 townships have been published, representing 75 percent of the Cobalt Resident Geologist's area. The remainder of the area should be completed by the end of 1987.

Technical assistance and consultative services were provided to prospectors, industry representatives, geologists, government, and the general public as a means of encouraging and facilitating effective exploration and development in the area. Ten field trips were conducted by office staff for university, high school, public school, industry, and government representatives. These trips are important in introducing new companies to the exploration potential of the area and in educating those not familiar with the local geology. In addition, lectures and field trips were provided for two area Ministry of Natural Resources Junior Ranger camps and brief lectures were presented at local public schools.

Maps and reports pertaining to this resident geologist's area area listed in Table 8.1.

Numerous potentially hazardous sites near Cobalt were inspected with representatives of the Ministries of Labour and Natural Resources and recommendations for remedial action presented.

The Resident Geologist was primarily occupied during the year with the administration and management of six projects initiated in 1985. In addition to dealing with over 500 office visits by mining representatives and a similar number of phoned and written inquiries, a number of property visits were carried out and mapping of Banting and part of Best Township was continued.

Use of the facilities and services provided by the Resident Geologist's Office declined by 2 percent from the fairly high levels reached during 1984 and 1985. Additional programs being carried out by office staff include the following:

GEOLOGY AND MINERAL POTENTIAL OF BANTING TOWNSHIP AND THE WESTERN PART OF BEST TOWNSHIP, NIPISSING DISTRICT by M.C. Smyk

During the 1986 field season, a program was undertaken to complete detailed geological mapping and assess the mineral potential of Banting Township and the western part of adjacent Best Township. This project is a continuation of the study initiated by L. Owsiacki in the McLean Lake-Lundy Lake area between 1983 and 1985 (Owsiacki 1984). The current study area, covering approximately 110 km^2, encompasses the previous study area and is located rough-

TABLE 8.1: MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports
OFR 5470
OFR 5570
OFR 5572
OFR 5573
OFR 5574
OFR 5591
OFR 5592
OFR 5608
OFR 5609
OFR 5610
OFR 5611
OFR 5612
OFR 5613
OFR 5614
OFR 5615
OFR 5618
OFR 5625

Preliminary Maps - Geological Series
P.2840
P.2841
P.2842

Preliminary Maps - Data Series
GDIF 310
GDIF 311
GDIF 312
GDIF 286
GDIF 287
GDIF 288
GDIF 329
GDIF 330
GDIF 331
GDIF 345
GDIF 346
GDIF 347

Coloured Maps
Map 2050 (reprint)
Map 2051 (reprint)
Map 2052 (reprint)

Miscellaneous Reports
MP 128
MP 129
MP 130
MP 131
MP 132

ly 35 km southwest of Cobalt and 15 km northwest of Temagami.

A mapping crew was based near Temagami for the majority of the field season and also established tent camps in more inaccessible parts of the study area. Extensive lake and river systems facilitated the mapping, supplementing pace and compass traverses which were conducted at a scale of 1 inch to 660 feet (1:7 920). Active logging in the immediate area provided additional road access while clear cutting and extensive burn operations resulted in extensive outcrop exposure. Systematic sampling and assaying of rock units and veins was conducted in order to outline favourable zones for further exploration and study.

The oldest rocks in the study area are Archean metavolcanics which are predominantly pyroclastic with minor flow units. These metavolcanic rocks have been intruded by a variety of ultramafic to felsic rocks during the Archean, including hornblende gabbro, diorite, quartz monzonite, lamprophyre, and an ultramafic diatreme-breccia pipe. The remainder of the rocks are Proterozoic and consist of gently-dipping Gowganda Formation sedimentary rocks, Nipissing diabase, and post-Nipissing diabase dikes. Glacial drift is extensive and includes both glaciofluvial and morainal deposits. Greater detail is available in Smyk and Owsiacki (1986).

Despite a marked similarity between rocks in the study area and those of the Cobalt silver camp, little evidence of silver-cobalt arsenide mineralization exists. However, detailed mapping and assaying have delineated zones of potential economic interest. These include:

1. Quartz veins associated with strongly deformed and altered granitic rocks with gold and copper mineralization.
2. Quartz ± calcite veins in Nipissing Diabase with gold, silver, and copper mineralization.
3. Hornblende gabbro with base metal and possible potential for platinum group element mineralization.
4. Ultramafic diatreme breccias and alteration zones associated with post-Archean intrusive activity which will be analyzed for radiometric elements, rare earth elements and platinum group elements.

Further geochemical, petrographic, and analytical work will be performed during the winter. An Open File Report documenting the results of field and laboratory work will be completed in March 1987. It is hoped that this report will be used in developing exploration targets pending resolution of the Temagami Indian Band land claim which has currently prevented staking and exploration activity in the area.

ECONOMIC EVALUATION OF THE LAKE TEMISKAMING PALEOZOIC OUTLIER by W.T. Grant

A project, initiated in 1985, to evaluate the economic potential of limestones and dolostones comprising the Lake Temiskaming Paleozoic Outlier has been concluded. An Open File Report describing the project and the results of field work is near completion and will be published in early 1987.

The project initially involved detailed mapping and sampling to delineate those limestones and dolostones of best potential for economic exploitation. This assessment was based on several factors including geochemistry, physical properties, and depth of overburden. Several areas of best potential were defined and diamond drilled this summer to test the lateral and vertical continuity of grades and beds. In total, 183 m of drilling was completed in 12 holes. Core from each hole was split, with one half stored at the Cobalt Drill Core Library and the other half submitted for geochemical analysis. Analytical results from earlier surface sampling identified six zones of relatively pure, high-calcium limestone and high-magnesium dolostone within the outlier.

The Ordovician-aged Farr Formation is generally a high-calcium limestone with varying MgO and SiO_2 content and the Silurian-aged Thornloe Formation contains horizons of both high-calcium limestone and high-magnesium dolostone. These stones are both presently in great demand by area mines, smelters and refineries. Other, more limited markets for these materials are in road construction and in agriculture.

MINING AND TOURISM PROJECT by E.M. Dodd

The Heritage Silver Trail is a self-guided tour designed to illustrate, through example, the historical impact of Cobalt's mining past. The tour is meant to be educational, informative, and picturesque and consists of five major sites. Each site has a viewing area, picnic table and parking area. Throughout the tour, signs have been strategically placed to describe historical and geological features and generally inform the public of the pertinent aspects at that site. One highway billboard has been erected and three others are scheduled for erection in the spring of 1987. In all, five site signs, ten descriptive signs, five billboards and numerous smaller directional signs will guide the tourist through the trail. A brochure is presently being completed and will include additional information on each major site and short descriptions of other sites seen along the route. A large map of the trail route will be available both within the brochure and at the beginning of the trail in the form of a large billboard.

Future minor maintenance and any further expansion of the Heritage Silver Trail will be tentatively undertaken by the Cobalt Mining Museum. During construction, an estimated 1000 visitors passed through the sites and the response was overwhelmingly in favour of the idea. The tour does not officially open until May, 1987.

BUILDING STONE INVENTORY by E.M. Dodd

Past and present producing quarries of decorative building stone, located in six townships in the North Bay-Thorne area were documented in a report which may be published in 1987. The report includes descriptions, location maps and localized geology maps of each of the eight quarries in the area. In addition, 20 cm by 15 cm slabs of representative samples from each of the quarries have been cut and polished for display at the Cobalt Office.

Only three of the quarries are presently active. The McLaren's Bay Mica Stone Quarry at Reynolds Lake is the most thoroughly developed. The predominant stone quarried throughout the area is a quartz-muscovite gneiss with pink, green, or grey colour variations. The Thorne Ski Hill Quarry contains extensive reserves of a quartz-muscovite (very quartzose) gneiss and, recently, a small deposit of a black quartz-biotite gneiss was uncovered and will be quarried. The Jocko Township Quarry presently provides minor amounts of stone for local consumption.

CORE LIBRARY by P. Anderson

An additional three sets of core racks were built in 1986 at the Cobalt Core Library in North Cobalt, and completes 75 percent of the indoor storage capabilities. Five companies donated 3195.2 m of core in 1986 from 38 holes which were drilled locally. The library now contains 9701.9 m of core. Telescoping of many of the holes will begin in 1987 to create more storage space. A survey completed earlier in the year revealed that 304 613 m of core are currently stored by local companies on racks in varying stages of disrepair.

MINING ACTIVITY

Silver prices continued their downward trend and finished the year at U.S. $5.30, a drop of 13 percent from last year's level. This annual downtrend began in 1982 and may have bottomed this year. Production of the metal dropped drastically, to the lowest level in decades, when the Agnico-Eagle Mines Limited Penn Mill was destroyed by fire. This company is the dominant producer in the area and events affecting their operations directly relate to area production levels. Mining has, however, continued at two of the company's area mines and ore is being stockpiled at the mine sites. With resumption of milling and refining in 1987, production will likely show a dramatic increase over the next two years.

Although a production decision has not yet been made at the Hellens-Eplett Mining Incorporated (formerly the Silverside Resources Incorporated) silver property in Lorrain Township, exploration and development continued throughout the year at a rapid pace to bring the property to a production decision point. A decline ramp was completed and the vein zones discovered from surface drilling were intersected by a short crosscut. The grade has been exceptionally good in some areas and bulk sampling has indicated that some continuity exists. Raising and drifting on many of these veins is now underway as part of a preproduction development program.

Quarrying by Dymond Clay Products Limited expanded at an extremely rapid rate as local iron mines began purchasing their product for use in fluxing pellets at the mine sites. Industrial mineral exploration and development has increased considerably in the past six years and may help to alleviate problems associated with declining metal mining in the area. This segment this year accounted for 3.6 percent of the gross value of mineral commodities produced in the Cobalt Resident Geologist's area.

Operations at the Dofasco-owned Sherman Iron Mine have been relatively stable over the past five years. The mine was once again closed for a five-week period during the summer which suggests that the mine will probably operate at or near the same level for some time.

Three mills are located within the Cobalt area but none operated during 1986. The Penn Mill (Agnico-Eagle Mines Limited), a normally reliable operator was destroyed by fire on February 22, 1986. Only the primary crushing plant, smaller buildings and part of the workshop survived the blaze. A new mill is presently under construction and scheduled to begin operation by May 1, 1987. When operations recommence, the mill will likely operate on a year-round basis until all stockpiled ore is processed. It is rated at 300 tons per day but will likely process about 275 tons of ore per day. Although the operating system will remain much the same, minor changes have been made. These include the replacing of classifiers with cyclones and adding extra retention time in the flotation circuit by using eighteen rather than fourteen cells. In addition, only one ball mill will be utilized instead of the two used in the old mill.

The Agnico-Eagle Mines Limited refinery did not operate during the year as a result of the loss of the company's mill. Operations will resume in 1987 when mill construction is completed.

A new company, XIB Resources Limited was formed during the year and obtained a large grant to assist in refurbishing parts of the old Cobalt Refinery. At this point in time, many of the buildings located on the eastern half of the refinery site have been upgraded and preliminary plant preparation has been completed. Initially, the company plans to extract copper from impregnated sludge and liquids by either electroplating or cementation with iron powder. A grinding circuit is being built to grind electronic scrap comprised of plastic, copper, nickel, and gold. After the plastic is removed, the remaining material will be sold to a refinery for further processing. Production is slated to begin early in 1987 and additional extraction of a variety of other metals from secondary feedstocks is planned for the future.

Mineral commodities mined and paid for during the year decreased significantly from levels reached in 1985. Approximately 13 227 ounces of silver were produced from two area mines, representing a greater than 99 percent decline from the 1 650 000 ounces produced in 1985. Iron pellet production increased to 1 036 300 tonnes. Significant production gains were made for the second consecutive year in industrial minerals where limestone production increased by 1525 percent from the previous year to 130 000 tonnes. Quarrying of decorative building stone continued at a similar rate to last year. Substantial quantities of sand and gravel were also extracted. Cobalt, copper, and nickel were mined together with silver but not recovered. The estimated total gross value of minerals extracted in the area during 1986 dropped 20 percent from last year to $43 100 144.

LANGIS MINE (AGNICO-EAGLE MINES LIMITED)

Continuing depressed silver prices during the year delayed restarting of mining operations at this silver mine until December, 1986. In recent times, the mine maintained production between December, 1982 and March, 1985, although exploration has been continuous since it was first dewatered in 1980. Total production during this period has been 29 419 tons, yielding 371 038 ounces of silver for an average grade of 12.61 ounces per ton.

A new zone, consisting of numerous high-grade silver intersections was discovered in September, 1985 to the southeast of the Langis #6 shaft, in a previously unexplored area. All underground and surface exploration during the year was undertaken to further define the potential of this area. Extensive underground diamond drilling of long (900 m plus) holes encountered 10 to 15 widely scattered, high-grade intersections in all three host rock units typical of the camp. The drilling has identified the presence of a deep linear trough in the Keewatin basement, infilled by approximately 325 m of Gowganda Formation, Coleman Member sediments. Intersections, at present, occur along the western margin of this structure within both the Nipissing Diabase and Keewatin volcanic rocks. At this location, the Huronian sediments are less than 30 m thick.

Underground development has been limited to 360 m of crosscutting on the 400 foot Level of the #6 shaft. The crosscut has been driven to the southeast to provide drill stations which can be used to further define the potential of this area. Underground exploration diamond drilling increased by 14 percent from same period last year to 7963 m.

Mining is proposed to begin again in December, 1986 and will concentrate on the #64-110 vein and minor remnants of other veins.

BEAVER–TEMISKAMING MINE (AGNICO–EAGLE MINES LIMITED)

Silver mining, exploration, and development continued thoughout the year at the relatively reduced levels initiated at the end of 1985. The bulk of the ore was obtained from two principal veins and the remainder from four relatively new and minor veins. Fifty percent of the ore originated from the #41 vein, primarily from above the 1330-foot level and averaged about 29 ounces per ton. The vein, a significant producer for the past several years was mined out in July, although much broken ore remains in the stope. Thirty-four percent of the ore originated from the #37 vein, primarily from the 1600-foot level and averaged a relatively low 3.9 ounces per ton. Twelve percent of the ore, which averaged 5.0 ounces per ton was obtained from the Brady Lake area of the mine, as exploration muck from drifting along the #63 vein on the 1450 foot sublevel. The remainder of the ore was obtained from veins #56 and #61, from the 1330-foot level and from the #44 vein, above the 1330-foot level. This vein was one of the richer deposits in the mine and was mined out in February, although much broken ore still remains in the stope. In all, production from this mine declined to 9256 tons of ore from 22 188 tons of ore in 1985; a drop of 58 percent. All ore produced during the year was stockpiled at the mine site.

No development work was undertaken in the main south mine workings. In the Brady Lake area, to the northwest and accessed from the 1600-foot level, 173 m of drifting and crosscutting was carried out on the 1450-foot sublevel. In addition, a 58 m raise was put in and a new sublevel started at the 1320-foot elevation. Ninety-one metres of crosscutting has been completed at this location to date.

Underground exploration diamond drilling declined for the second consecutive year, by 4 percent to 6831 m. Ninety-nine percent of the drilling was in the Brady Lake area. Although numerous veins were intersected and carried minor cobalt and silver values, no significant intersections were made. At present, limited reserves have been identified and exploration will continue in this area at high levels to expand these reserves.

All stopes have been developed in veins cutting Archean mafic volcanic flows below a significant, steplike structure formed by the lower contact of a Nipissing diabase sill (Robinson 1984). The prime focus of exploration today (Brady Lake) differs in that veins occur closely related to a wide band of black, cherty interflow sediment.

SHERMAN MINE (DOFASCO INCORPORATED AND TETAPAGA MINING COMPANY LIMITED)

For the fifth consecutive year, this relatively low-grade iron mine was shut down for a five-week period in 1986. Production levels increased marginally (4 percent) to 1 036 000 tonnes of iron pellets, recovered from 3.44 million tonnes of crude ore. At the same time, mining of waste was reduced by 4 percent to 2.7 million tonnes.

Three pits were again utilized during the year. Sixty percent of the ore was mined from the East Pit, as was the case last year. This elongated pit is now the main production pit at the mine. During 1986, the second bench was completed and approximately one half of the third bench was mined. Twenty-eight percent of the ore was mined from the central portion of the West Pit and twelve percent from the South Pit. Mining of the latter pit is more or less a scavenging operation, with remaining ore in the pit removed by backhoe. The new Turtle Lake Deposit is currently being stripped and initial mining projected to begin in mid-1987.

The only major new development is a firm commitment to continue fluxing all pellets at the mine site. Last year, a pilot plant was established and is still being utilized to flux pellets. The Sherman and Adams Mines are the only two iron ore mines in North America in full-flux pellet production.

HELLENS–EPLETT MINING INCORPORATED (SILVERSIDE RESOURCES INCORPORATED AND INTERNATIONAL PLATINUM CORPORATION)

Development at this silver property, located in Bucke and Lorrain Townships has progressed to an advanced stage since last year. A decline was completed in February, 1986 to a total length of 829 m. The portal is located in Bucke Township adjacent to a small claim purchased earlier in the year, primarily for the purpose of dumping waste rock from the decline construction. The end of the decline is located 124 m (124 m a.m.s.l.) below surface and just below the unconformity between flat-lying Huronian sediments and steeply dipping Keewatin mafic volcanic flows. A short crosscut was driven to the north and south to intersect veins drilled earlier from surface. At least five veins carrying significant silver were cut during this phase of the exploration. In addition, an extensive underground exploration diamond-drilling program was carried out which located a new cobalt-silver vein extending northeast from the previously defined North Zone. Assays ranged up to 100 ounces per ton silver over a five foot core length.

In March, a short raise was put up along one of the veins in the North Zone (Vein #5), which blossomed immediately above the unconformity into one of the more spectacular silver veins to be seen in the camp in quite some time. Although the vein itself was rather narrow (3 cm cobalt/carbonate/horn silver), the adjacent wall rock was cut by an extensive network of massive silver plates to 1 cm in thickness, extending up to 2 m away from the vein. Assays from samples in this area were commonly in the thousands of ounces per ton.

A bulk sampling program was undertaken in May, to test grade continuity on two of the vein systems. Three samples totalling 457 tons were taken from the North Zone (Vein #5) and one sample, totalling 247 tons, was taken from the South Zone (Vein #1). To this point, 55 m of drifting have been completed along Veins #1, #3, and #5. Results from the bulk sampling produced a composite grade of 25.88 ounces of silver per ton.

Underground exploration diamond drilling totalled 8045 m to the end of September. In October, a new shaft was collared in 20 m of clay to serve as a ventilation raise initially and ultimately as a production shaft, should mining begin. An extensive underground development program was also started and to this point, 179 m of drifting and crosscutting and 21 m of raising have been completed as part of this program.

BUCKE QUARRY (DYMOND CLAY PRODUCTS LIMITED)

With the advent of the new flux-pelletizing plants at the Sherman and Adams Mines, this company has continued to expand at a rapid rate and has within two short years grown from a minor producer of 1600 tonnes of limestone to the third largest industrial mineral quarry operation in Northern Ontario. The operation began in 1980 with a one-person staff and annual production of 120 tonnes of agricultural limestone. This year, production totalled 130 000 tonnes and employment at the quarry has risen to 15. During 1986, plant expansion continued with the addition of a new screening plant, conveyors, and a pneumatic truck load out. Approximately 10 acres of land were cleared south of the pit and 15 000 tonnes of overburden removed from the east end of the pit. The pit itself has increased significantly in dimensions and now measures about 200 m by 100 m by 7 m deep.

Of total production this year, 92 percent was sold to the Sherman and Adams Mines as flux limestone, 6 percent was metallurgical limestone sold to the Kidd Creek and Noranda Smelters, 1 percent was agricultural limestone and 1 percent sold as riprap and armourstone. Production may expand another 15 percent in 1987 and potential for accessing different markets in the future remains high.

EXPLORATION ACTIVITY

Despite continuing depressed commodity prices, exploration in this area increased markedly from the relatively high levels reached in 1985. Total underground and surface exploration diamond drilling increased by 60.5 percent from the previous year to 48 936 metres. Surface drilling increased by 82 percent to 20 781 metres and underground drilling increased by 48 percent from 1985 (Figure 8.2). These increases are due in part to the expanding interest and exploration for gold in the area and a renewed interest in silver, generated by the success and continued development of the Hellens-Eplett Mining In-

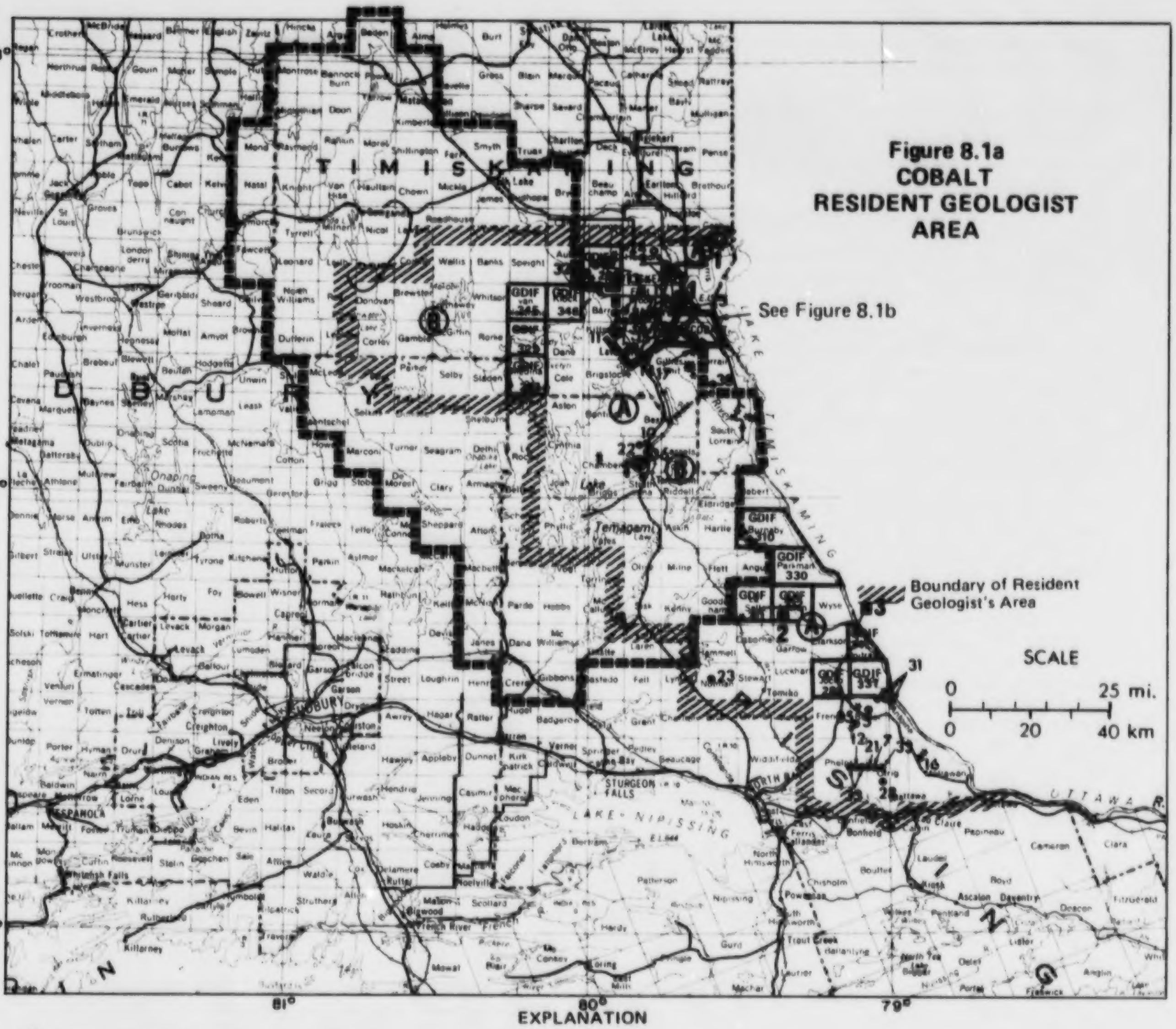
48°
47°
46°
81°
80°
79°
TIMISKAMING
SUDBURY
NIPISSING
Temagami
LAKE NIPISSING
STURGEON FALLS
NORTH BAY
SUDBURY
ESPANOLA
OTTAWA R.
See Figure 8.1b
Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
GDIF 330
GDIF 331
GDIF 345
GDIF 346

Figure 8.1a
COBALT
RESIDENT GEOLOGIST
AREA

EXPLANATION

● Producing Mines, 1986
  1. Sherman Mine (Dofasco, Tetapaga Mining Co. Ltd.). . . Fe
  2. Beaver-Temiskaming Mine (Agnico-Eagle Mines Ltd.) . . Ag

◑ Mines Under Development, 1986
  1. Hellens-Eplett Mining Inc. (Silverside Resources Inc. / International Platinum Corp.) . . . . Ag

◐ Mines Undergoing Exploration, 1986
  1. Langis Mine (Agnico-Eagle Mines Ltd.) . . . . Ag
  2. Pan Silver Mine (Jascan Resources Inc.). . . . . Ag
  3. Slate Creek Decline (Agnico-Eagle Mines Ltd.). . . . . . Ag
  4. Conisil Mine (Canadaka Mining Corp.) . . . . Ag

⊕ Mines Currently Maintained on Stand-By Basis
  1. University (Canadaka Mining Corp.). . . . . Ag
  2. Cleopatra (Canadaka Mining Corp.) . . . . Ag

■ Producing Quarries
  1. Dymond Clay Products Ltd. . . . . Limestone
  2. McLaren's Bay Mica Stone Quarries . . . . Stone
  3. P. Pharand Quarry . . . . Stone

• Exploration and claim staking activity in 1986 (keyed to TABLE 8.1)

* Assessment Work Filed in 1986 (keyed to TABLE 8.2)

Ⓐ Location of Resident Geologist's Field Mapping Parties in 1986

Ⓑ Location of Ontario Geological Survey Field Mapping Parties in 1986

— Map or report issued by the Ontario Geological Survey in 1986

--- Areas withdrawn from staking through Bear Island Indian Caution

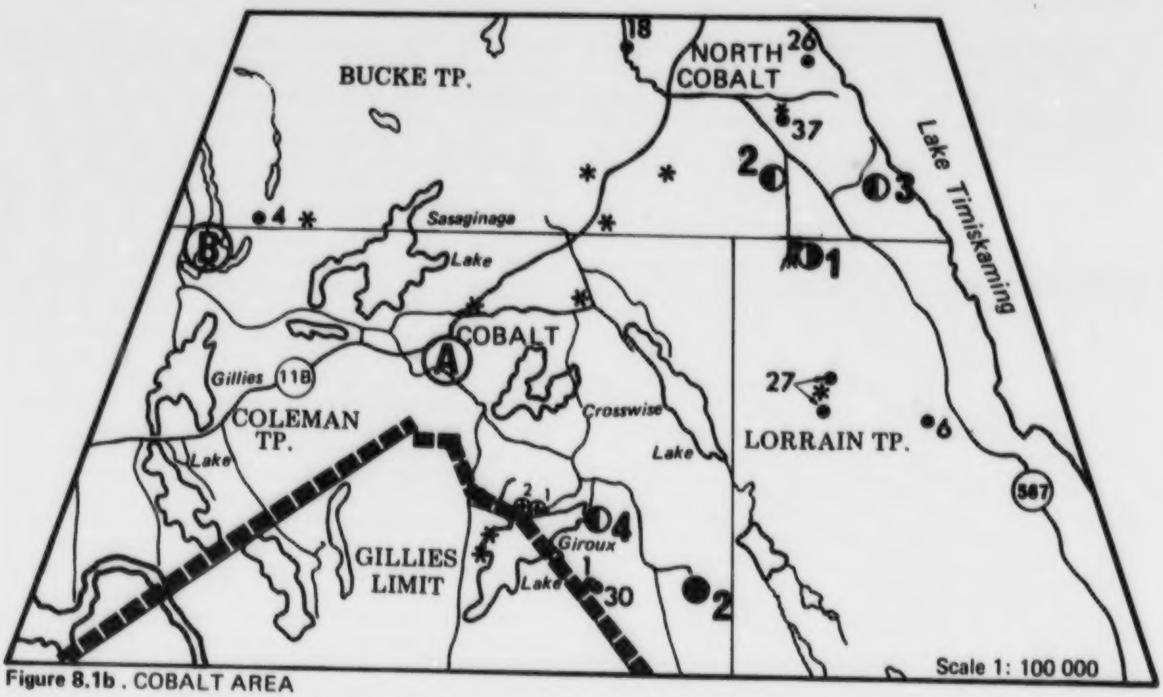
BUCKE TP.
NORTH COBALT
18
26
37
2
3
Lake Timiskaming
4
Sasaginaga
Lake
B
1
COBALT
A
Gillies
118
COLEMAN TP.
Lake
27
Crosswise
Lake
LORRAIN TP.
6
567
2 1
4
Giroux
GILLIES LIMIT
Lake
1
30
2
Scale 1: 100 000

Figure 8.1b . COBALT AREA

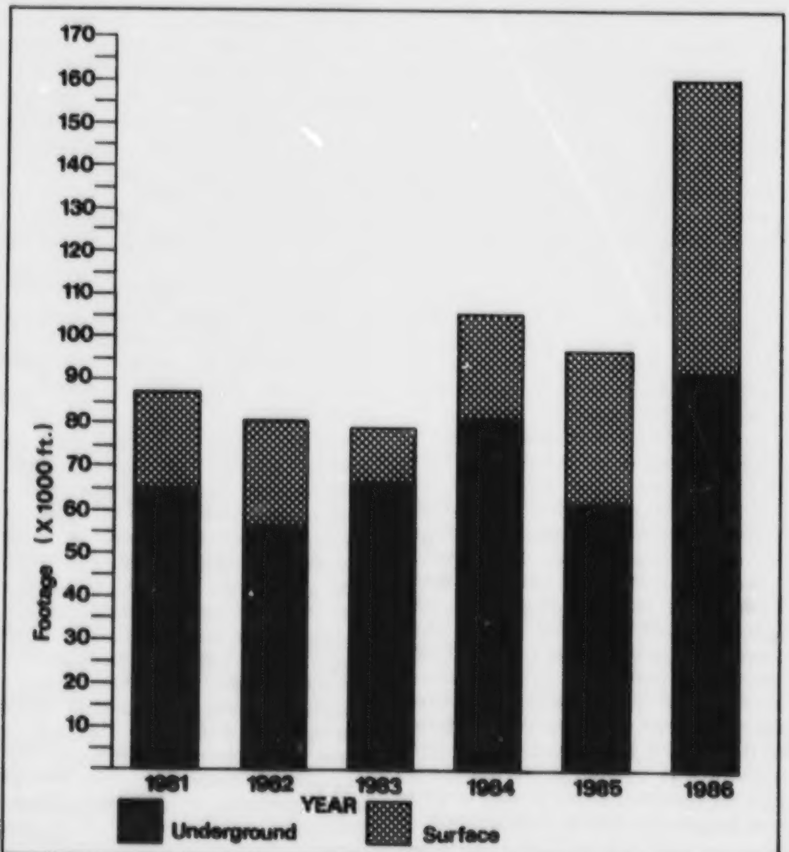

Figure 8.2. Exploration diamond drilling activity in the Cobalt Resident Geologist's Area.

corporated Deposit. Claim staking activity reflected this renewed interest and increased by 69 percent from last year to the highest levels recorded in the past decade. This is significant, particularly with the continuing detrimental effects of the Temagami Bear Island Indian Caution still being felt. Emphasis was once again on precious metals exploration and although silver was, as expected, the most sought after mineral, gold exploration, particularly in the Temagami area, again showed a marked increase from previous years, reaching levels not seen since the Bear Island Indian Caution resticted claim staking in the 1970's. The presence of up to six old platinum occurrences (assaying up to 1.5 ounces per ton) in the area and the growing world-wide interest in this metal spurred some new exploration around Temagami. Exploration for limestone, dolostone, and silica continued at reduced levels from last year.

The most significant discoveries of the year included a new zone of high grade silver mineralization found southeast of the Langis Mine in Harris Township by Agnico-Eagle Mines Limited and a new, wide intersection of gold drilled by Lacana Mining Corporation and Stroud Resources Limited in Strathy Township. Major exploration and development undertaken during the year is summarized below and in Table 8.2 (*see* Table 8.2).

COBALT AREA

Jascan Resources Incorporated signed an option agreement with Pancontinental Mining Limited that will allow them to initially acquire an 85 percent interest in the Pan Silver Mine Property in Bucke Township. The company is presently dewatering the underground workings of this former silver producer and plans to initiate an exploration-drifting and crosscutting program early in 1987. The property adjoins the presently developing Hellens-Eplett Mining Incorporated silver-deposit located 1 km to the south.

Silver Bar Mines Limited acquired a group of eight claims in Bucke Township, underlain by Nipissing Diabase intruding thinly laminated siltstones (Firstbrook Member) of the Gowganda Formation. An old shaft (Beanland), put down on a surface exposure of a narrow cobalt/silver arsenide vein in the diabase near its lower contact with the sediments, was the initial focus of exploration. Three holes were drilled in an effort to intersect the downward and lateral extension of this vein. Although a narrow fault was identified in the diabase, the contact itself was quite sharp and not a faulted contact as described on geological maps. No distinct arsenide vein was intersected in any of the holes, although numerous, narrow quartz/carbonate veins carrying minor calcopyrite were observed. Exploration was subsequently shifted to the southwest part of the property where a quartz vein carrying gold values was discovered. Chip sampling along 15 m of exposed vein returned values ranging from 0.03 to 0.24 ounces per ton gold. A soil-sampling survey was subsequently completed over this area in an attempt to identify possible strike extensions and new targets for future investigation.

Legacy Explorations Ltd. was formed early in the year, primarily to explore two claim groups held by local geologist R. Benner in Firstbrook and Coleman Townships. The McLaren Lake Group was the subject of earlier exploration by Hudson Bay Mines Limited (Owsiacki 1985) and contains an old shaft put down on a weak cobalt/silver arsenide vein. The Charlotte Lake Group of claims adjoins to the east and contains an old cobalt occurrence, also explored in the past. Initial line cutting was followed by a magnetometer and gradiometer survey and an extensive diamond-drill program carried out over both properties. Drilling below the known cobalt occurrence at Charlotte Lake intersected a strong, massive cobalt vein but silver was not found. A number of major shear zones with accompanying quartz veining and chalcopyrite mineralization were also intersected in diabase, but did not carry silver values. The cobalt vein was located near the base of a steeply north-dipping Nipissing diabase sill intruding Lorrain Formation arkose. Drilling in the McLaren Lake area was initially intended as a follow-up of geophysical conductors and structural lineaments. This approach was not very successful and holes were spotted in the vicinity of a shaft and known silver occurrence in an attempt to trace the possible downward extension of the vein. The vein was not intersected but one hole drilled north of this location did intersect a fracture in sediments adjacent to a Nipissing Diabase contact that carried two or three flakes of native silver. An additional three holes were put down to follow up this intersection but did not locate further occurrences. Drilling from this program did, however, provide much new geological information which will be invaluable to a reinterpretation of this area and may provide new possible targets for further exploration.

T.T.L. Minerals Limited drilled two short holes over the underground workings of the old North Cobalt Shaft in Bucke Township (Owsiacki 1986). The purpose of the holes was to test for a possible extension of the north shear vein, identified last year, up into the Huronian sediments. The sediments were found to be less than 3 m in thickness in this area. A zone of quartz and calcite veining was intersected at a relatively shallow depth and contained only minor chalcopyrite mineralization. The property was recently purchased by Mystery Mountain Minerals Ltd. of Vancouver who plan to resume exploration in the near future.

Silver Century Explorations Limited continued a drilling program on Bursary Silver Mines Limited's Dreadnought claim in Coleman Township. Two weekend prospectors earlier discovered a new high grade occurrence of silver with a metal detector on this ground (Owsiacki 1986). Four holes were completed and concluded a sixteen-hole program designed to test the vein for continuity. Values up to 454 ounces per ton were intersected over narrow widths. Agnico-Eagle Mines Limited subsequently took out an option on the property and initiated a follow-up exploration program during the summer which included a VLF survey and additional diamond drilling. Eight holes were completed and, although the vein extended for significant distances, the ore-grade silver values were restricted to a narrow, pipe-like shoot with approximate dimensions of 10 m laterally by 35 m vertically.

Silverside Resources Incorporated maintained an active presence in the camp. The company continued

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 8.2

Number on Figure	Individual or Company	Activity
1	Agnico-Eagle Mines Limited	Surface diamond drilling, geophysical survey, Coleman Township
2	Agnico-Eagle Mines Limited	Surface diamond drilling, Dymond Township
3	Agnico-Eagle Mines Limited	Surface diamond drilling, Harris Township
4	Armstrong, J.	Claim staking (4), surface diamond drilling, Bucke Township
5	Barry, H.V.	Claim staking (7), Butler Township
6	Bigelow, G.	Claim staking (4), Lorrain Township
7	Brady, M.	Claim staking (10), Olrig Township
8	Brydges, D.	Claim staking (8), Firstbrook Township
9	Butler, R.	Claim staking (2), stripping, trenching, Dymond Township
10	Canadian Nickel Company Limited	Stripping, trenching, geological survey, Strathy Township
11	Chitaroni, A.	Claim staking (4), Coleman Township
12	Deschamps, R.	Claim staking (9), Phelps Township
13	Ferguson, B.	Claim staking (6), prospecting, geological mapping, Bucke, Coleman, Lorrain and Lundy Townships
14	Gignac, D.	Claim staking (2), Coleman Township
15	Gilson, S.A.	Claim staking (16), Coleman and Firstbrook Townships
16	Hudson Bay Mining and Smelting Limited	Claim staking (2), geophysical survey, surface diamond drilling, Mattawan Township
17	Laakso, R.W.	Claim staking (2), Coleman Township
18	LaForge, M.C.	Claim staking (2), Bucke Township
19	Legacy Explorations Limited	Surface diamond drilling, geophysical survey, Firstbrook and Coleman Townships
20	Link, W.O.	Claim staking (7), Bucke Township
21	MacAdams, W.	Claim staking (5), Olrig Township
22	Manridge Explorations Limited	Stripping, trenching, Strathy Township
23	McClements, A.	Claim staking (23), Notman Township
24	Morgan, K.	Prospecting, geophysical survey, Lundy Township
25	Oslund, M.	Claim staking (1), Bucke Township
26	Paquette, D.	Claim staking (7), Bucke Township
27	Proteus Resources Incorporated	Geophysical survey, surface diamond drilling, Lorrain Township
28	Rose, D.	Claim staking (1), Olrig Township
29	Silver Bar Mines Limited	Surface diamond drilling, stripping, soil geochemistry, Bucke Township
30	Silver Century Explorations Limited	Surface diamond drilling, Coleman Township
31	Silverside Resources Incorporated	Claim staking (50), geological survey, Butler, Antoine and Eddy Townships
32	Silverside Resources Incorporated	Geophysical survey, Lundy Township
33	Sims, W.E.	Claim staking (21), Phelps and Olrig Townships
34	Smirle, R.G.	Claim staking (1), Coleman Township
35	Snodden, L.	Trenching, Butler Township
36	Stroud Resources Limited and Lacana Mining Corporation	Surface diamond drilling, Strathy Township
37	T.T.L. Minerals Limited	Surface diamond drilling, Bucke Township
38	Wassenaar, W.	Claim staking (2), Lorrain Township
39	Williams, J.F.	Claim staking (2), Coleman Township

an exploration program on claims optioned from geologist B. Ferguson in Lundy Township (Owsiacki 1986). Following a drill program last year which intersected a good grade silver/cobalt arsenide vein, additional claims were staked and an extensive line-cutting and geophysical program carried out during 1986. VLF and magnetometer surveys have identified numerous anomalously conductive areas which will be investigated in the future.

Proteus Resources Incorporated hold a large group of claims adjacent to the south and east of the Silverside Resources Incorporated/International Platinum Corporation ground in Lorrain Township. An option agreement was completed with Silverside Resources Incorporated early in the year which could grant the latter company a 25 percent interest in the property if $250 000 were spent on exploration in 1986. An extensive diamond-drill program (40 holes) was subsequently completed during the year and a number of interesting silver and gold values obtained. The best silver intersection included 13.6 ounces per ton from a narrow cobalt arsenide vein cutting Keewatin mafic volcanic flows. Gold values up to 0.4 ounces per ton were intersected within rhyolitic volcanic and/or intrusive rocks, particularly where pyrite mineralization was present. A follow-up TURAM survey has since been proposed. The company also optioned a silver property in Donovan Township but no exploration was undertaken in 1986.

Agnico-Eagle Mines Limited continued a surface exploration program in the vicinity of the Langis Mine in Harris Township. A total of three holes were drilled to test a new silver discovery first identified from underground drilling. The company also initiated an extensive exploration program on claims in Bucke Township, optioned from Consolidated Professor Mines Limited. The property includes a decline which was dewatered last year and is now being used to provide drill stations. A total of ten, long, relatively flat holes have been drilled to the west from this location to test a thick wedge of Huronian sediments for possible silver veins. The sediments are sandwiched between overlying Nipissing diabase and underlying, steeply dipping Keewatin mafic volcanic rocks. To this point, the holes have intersected a strong massive cobalt (±silver) vein which has been followed for more than 300 m through the volcanic horizon. Future holes will attempt to intersect this vein above the unconformity.

In Dymond Township, Agnico-Eagle Mines Limited optioned a property from M. Shepherdson, the farmer who owns the land, where a new cobalt occurrence was discovered in Nipissing diabase last year (Owsiacki 1986). The owners of the property completed stripping and trenching of the occurrence and exposed an interconnected zone of fracturing, over a 15 m width, containing sporadic cobalt bloom and anomalous silver values. Agnico-Eagle Mines Limited subsequently completed a five-hole drill program to test the downward extension of the mineralization and, although veins were intersected, no significant mineralization was encountered. The mineralization at surface was identified as occurring within the middle to upper parts of the diabase sill which had intruded Firstbrook Member laminated siltstones. This particular horizon and geological environment was not considered by the company to hold potential and the work has been concluded.

Canadaka Mining Corporation initiated a brief exploration program on properties previously owned by Sulpetro Minerals Limited and optioned by the former company in 1985. Underground workings were dewatered at the Conisil Property and 50 m of drifting carried out on the 535 foot level. The company, however, failed to meet requirements of the option agreement which resulted in the termination of exploration and the transfer of all properties to Novamin Resources Incorporated (formerly Sulpetro Minerals Limited). This company, together with Canacord Resources, who can earn a 30 percent interest in the property, plan a future underground exploration program similar to that initiated earlier by Canadaka Mining Corporation.

J. Armstrong, a local mining engineer, staked four claims in Bucke Township over the inferred extension of the #64 fault. Two drill holes were recently put down to intersect the projection of this fault into overlying Huronian paraconglomerate. The only interesting intersection was a 25 cm section of massive sulphide in the Huronian sediments. This may actually represent a massive-sulphide boulder, a relatively common occurrence in this area.

K. Morgan, entrepreneur, continued a modest surface-exploration program, including detailed prospecting and geophysics on claims in Lundy Township.

Fergham Resources acquired three claims in Bucke, Coleman, and Lorrain Townships. Mapping and sampling for silver were completed and a report of the results prepared and used in an effort to option the properties.

TEMAGAMI AREA

Exploration for gold in the Temagami greenstone belt increased dramatically in 1986. Three principle companies were active during the course of the year and numerous smaller ventures conducted evaluations of many of the old occurrences in the area.

Lacana Mining Corporation Limited and Stroud Resources Ltd. undertook a major diamond-drill program on their property in Strathy Township following encouraging results from a surface stripping and trenching program (Owsiacki 1986). Three parallel north-trending zones were identified and provided assays up to 0.5 ounces per ton gold over 6.3 feet. An initial 2000 foot drill program, designed to test for continuity below the trenches in two separate zones, returned a best result of 0.1 ounces per ton gold over 30 feet. Significant silver values were also obtained from some of the holes. A second 10 000 foot program was initiated in March to follow up the best looking areas and produced some of the widest intersections recorded in the Temagami area to date. Two holes on one section returned values including 0.22 ounces per ton gold and 0.53 ounces per ton silver over a core length of 23.8 feet and 0.145 ounces per ton gold over a core length of 56.7 feet. As a result, a third drill program was initiated in October with the intent of further testing this structure. To accomplish this, a local barge was converted and used to float the drill on Arsenic Lake.

INCO Limited undertook a major stripping, trenching, and sampling program on a gold showing on a group of claims adjoining the Lacana Mining Corp./Stroud Resources Ltd. property to the north. This program was undertaken after completion of a line-cutting program and a geological/geophysical survey in 1985.

Manridge Explorations Limited recently completed an option agreement to explore nine claims in Strathy Township. One of the claims adjoins the INCO Limited ground to the west and hosts known gold occurrences. A road was recently put into this area and a limited stripping and sampling program completed. Numerous grab and chip samples carried gold values to 1.5 ounces per ton. Additional exploration will be undertaken when the snow melts.

NORTH BAY AREA

Two companies were actively engaged in gold exploration in this area and a number of individuals continued working a small amethyst deposit in Butler Township. In addition, building stone properties were actively pursued and quarried.

Hudson Bay Mining and Smelting Co. Ltd. staked a large claim block in Mattawan Township and cut an extensive grid over the Grenville-age gneisses underlying the claims. Staking was done on the basis of anomalous gold values obtained during a regional till-sampling program done by an affiliated company. More detailed overburden sampling and a VLF survey were subsequently undertaken and followed up with a short diamond-drill program. No significant intersections were encountered in this drilling.

Silverside Resources Incorporated staked a large block of claims in Eddy, Olrig, Phelps, Butler, and Antoine Townships on the basis of a small gold occurrence found by this office (Owsiacki 1986). A reconnaissance geological-mapping program was undertaken in addition to some outcrop sampling. No interesting showings were found on this ground.

Numerous other companies expressed an interest in the Cobalt Resident Geologist's area and include TEMCO Mines Ltd., Nortario Limestone Limited, Exploration Aiguebelle Incorporated, ASP Investments, Keevil Mining Corporation, Corporation Falconbridge Copper, Teck Corporation, Lalonde Geological Consulting Limited, Monopros, Lakeshore Minerals, Shaft and Tunnel Engineering, Goodwin Mineral Exploration, Elmtree Resources, Sudbury Contact Mines limited, McIntyre Associates, Finneth Exploration Inc., Noranda Inc., Horne Gold Exploration, T Resources Ltd., GEMROC, Hubachek Resources, and Boston Creek Mines Ltd.

Prospecting activity remained at a fairly high level despite the continuing negative effects of a Land Claim filed in the past by the Temagami Indian Band. A more complete summary of exploration activity in the Cobalt Resident Geologist's Area in 1986 is provided in Table 8.2 and Figures 8.1a and 8.1b. Data either submitted for assessment purposes or donated are summarized in Table 8.3.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

GEOPHYSICS/GEOCHEMISTRY SECTION

J.E. Hanneson and R.S. Huxter (1986) initiated a study in the Cobalt area utilizing electromagnetic surveys in an attempt to trace Keewatin conductive sediments buried below thick deposits of Huronian sediments. A secondary intent is to map the unconformity using these EM-sounding techniques. Preliminary work was completed during the year to determine the feasibility of the project.

PRECAMBRIAN SECTION

P. Born (1986) completed mapping of Cassels and Riddell Townships which are located east of the Town of Temagami.

MINERAL DEPOSITS SECTION

R.J. Rice (1986) initiated a regional study of the sedimentology of the Lorrain Formation, particularily in the northern portions of the Cobalt Embayment.

RESEARCH BY OTHER ORGANIZATIONS

CARLETON UNIVERSITY

M.C. Smyk continued investigations, as part of an M.Sc. thesis, of the sulphide mineralogy of Archean interflow sediments and their relationship to silver-bearing carbonate veins in Cobalt.

D. Irwin initiated a B.Sc. thesis study of the petrology and sulphide mineralogy of Archean lamprophyres in the Cobalt area.

UNIVERSITY OF OTTAWA

G. Burbidge continued regional field studies investigating the sedimentology of the Gowganda Formation as part of a Ph.D. thesis. Rocks in the Lake Temagami area were investigated this past summer.

UNIVERSITY OF TORONTO

Dr. P.C. Lightfoot, a postdoctoral fellow at the university, initiated a study into the petrogenesis of the Nipissing diabase using combined trace element and Sr-, Nd-, and Pb-isotopic techniques. The study's purpose was to determine what roles partial melting and fractional crystallization played in the petrogenesis of the diabase and to determine the nature of the source regions of the magmas and define the extent of interaction of the magma with the crustal rocks.

RECENT PUBLICATIONS AND REFERENCES

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1986: Geology of Cassels and Riddell Townships, District of Nipissing; p.111-115 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p. Accompanied by 1 Chart.

TABLE 8.3 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY MINING DIVISION

SYMBOLS AND ABBREVIATIONS

Ag-Silver
am-amethyst
Au-Gold
BM-Base Metals
Cu-Copper
DDH-Diamond-Drill Hole Locations or Sections
DDS-Surface Diamond Drilling (where shown, the numbers following "DDS" indicate the number of holes drilled and the total length drilled respectively)
D-Donated by Company or Individual
DDU-Underground Diamond Drilling (where shown, the numbers following "DDU" indicate the number of holes drilled and the total length drilled respectively)
Geochem-Geochemical Survey
GL-Geological Survey
Lst-Limestone
Mag-Magnetometer Survey
Ni-Nickel
OMEP-Ontario Mineral Exploration Program
Pros-Prospectus
Res-Resistivity Survey
Rpt-Property or Mine Report
SA-Sampling, Assays
Seis-Seismic Refraction Survey
SP-Self Potential Survey
St-Stone
STr-Stripping
rTr-Rock Trenching
Verm-Vermiculite
VLF-Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Brigstocke & Best Twps.	31M/4, 5	Northwest Canalask Nickel Mines Ltd.	BM	D	Rpt	1964	
Bucke Twp.	31M/5	Armstrong, J.	Ag	D	DDH	1960	
Bucke Twp.	31M/5	Armstrong, J.	Ag	D	DDS 2-1010 ft, SA	1986	
Bucke Twp.	31M/5	Dymond Clay Products Ltd.	Lst	Assess	DDS 6-300 ft, SA DDS 3-144 ft, SA, Rpt	1982 1983	63.439
Bucke Twp.	31M/5	Ferguson, B.	Ag	D	GL, SA	1986	
Bucke Twp.	31M/5	T.T.L. Minerals Ltd.	Ag	Assess	DDS 3-289.4 ft, SA	1986	
Bucke & Lorrain Twps.	31M/5	Highland Crow Resources/Teck Corporation/ Northgane Minerals Ltd.	Ag, BM	Assess	DDS 5-4003 ft, SA	1984	
Butler Twp.	31L/6, 11	MacWilliams, M.	Verm	Assess	DDS 1-104 ft, rTr	1965	
Butler Twp.	31L/6, 11	Snodden, L.	am	Assess	rTr	1986	
Chambers Twp	31M/4 41I/1	Goldray Mines Ltd.	Au, Ag, Cu	D	GL, Geochem, Res, DDH	1962	
Chambers Twp.	31M/4 41I/1	Halkin Mines Ltd.	Au, Ag, BM	D	DDH	1960	
Coleman Twp.	31M/5	La Rose Mines Ltd.	Ag	D	Rpt	1925	
Coleman Twp	31M/5	La Rose Mines Ltd. (Violet Claim)	Ag	D	Rpt	1925	
Firstbrook Twp.	31M/5	The Hudson Bay Mines Ltd.	Ag	OMEP	DDS 4-1497 ft, VLF DDS 2-842 ft	1983 1984	OM83-8-C-212
Firstbrook & Coleman Twps.	31M/5	Legacy Explorations Ltd.	Ag	Assess & D	DDS 21-9899 ft, VLF, Mag, SA	1986	
Gillies Limit Twp.	31M/5, 4	Botha Lake Mining Corp. Ltd./Rayrock Mines Ltd.	Ag	D	DDS 8-2065.5 ft, Res, GL, Sa	1960	
Gillies Limit Twp.	31M/5, 4	Fairfax Mines Ltd.	Ag	D	Rpt Pros	1952 1959	
Gillies Limit Twp.	31M/5, 4	Fleming, S.	Ag	D	DDS 9-2470.5 ft, Res, SA DDS 1-128 ft, SA	1959 1960	
Gillies Limit Twp.	31M/5, 4	Nickel Rim Mines Ltd.	Ag, Au, Cu, Ni	D	Rpt, GL, rTr SA, Mag, SP, GL, EM SP, Mag, DDH DDS 2-573 ft DDS 1-1410 ft DDH DDS 1-1070 ft GL, DDH Mag, SA	19?? 1963 1964 1966 1967 1970 1971 1972 1974	
Gillies Limit Twp.	31M/5, 4	Nu-Silco Mines Ltd.	Ag	D	DDS 16-2876 ft, Res, Rpt, Mag	1961	
Gillies Limit Twp.	31M/5, 4	Rayrock Mines Ltd. (Plaskett Group)	Ag	D	Rpt, Res, GL, DDH	1960	
Gillies Limit Twp.	31M/5, 4	Santa Maria Mines Ltd.	Ag	D	GL, Res, DDH	1960	

TABLE 8.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Gillies Limit	31M/5, 4	Silco Mines Ltd.	Ag	D	DDH	1960	
Gillies Limit	31M/5, 4	White Falcon Mines Ltd.	Ag	D	Rpt, DDH, Res	1960	
Harris Twp.	31M/12, 5	Agnico-Eagle Mines Ltd.	Ag	D	DDS 4-2878 ft	1985	
Hudson Twp.	31M/12, 5	Hammerstrom, B.	Ag	D	SA	1966	
Hudson Twp.	31M/12, 5	Pollock, J.	Ag	D	SA	1949	
La Salle Twp.	31L/11, 14	Procter, A.	St	Assess	STr, rTr	1967/68	
Lorrain Twp.	31M/5, 6	Falconbridge Ltd.	Ag	D	GL, Geochem, DDH, VLF	1972	
Lorrain Twp.	31M/5, 6	Proteus Resources Ltd.	Ag	D	DDS 4-1690 ft DDS 16-10043 ft	1985 1986	
Lorrain & Bucke Twps.	31M/5, 6	Silverside Resources Ltd.	Ag	OMEP	DDS 18-8180 ft, SA DDS 18-7628 ft, Rpt, SA DDS 19-6492.5 ft, SA, Seis	1983 1984 1985	
Lorrain & Bucke Twps.	31M/5, 6	Silverside Resources Inc./International Platinum Corp.	Ag	D	DDU 62-20609 ft, SA	1985-86	
Lundy Twp.	31M/5, 12 41P/8, 9	Morgan, K.A.	Ag	Assess	GL, Rpt	1985	
Lundy Twp.	31M/5, 12 41P/8, 9	Silverside Resources Inc.	Ag	Assess	VLF, Mag	1985	2.9171
Mattawan Twp.	31L/7	Hudson Bay Exploration & Development Co. Ltd.	Au	Assess	DDS 3-1419 ft, SA	1986	
South Lorrain Twp.	31M/3, 4	MacBeth, G.	Ag	D	DDS 1-160.5 ft	1963-64	
South Lorrain Twp.	31M/3, 4	Millerfields Silver Corp. Ltd.	Ag	D	DDS 2-1581 ft	1967	
South Lorrain Twp.	31M/3, 4	Miller-Lorrain Mines Ltd.	Ag	D	DDS 1-639 ft DDS 1-405 ft DDS 2-363 ft, SA	1960 1961 1965	
South Lorrain Twp.	31M/3, 4	Price, J.A.	Ag	D	DDS 1-126 ft DDS 1-103 ft	1960 1962	
South Lorrain Twp.	31M/3, 4	Silver Tower Mines Ltd.	Ag	D	DDS 4-1723.5 ft, SA	1965	
Strathcona Twp.	31M/4 31L/13	Nickel Rim Mines Ltd.	Cu, Ni	D	DDH	1966	

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9. Sault Ste. Marie Resident Geologist's Area, Northeastern Region

G. Bennett[1], E.J. Leahy[2], J.P Donald[3], E. Frey[4], J.J. Kral[5], and D.J.J. Tortosa[6].

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[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[3]Drill Core Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

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[5]Contract Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[6]Resident Geologist, Ontario Ministry of Northern Development and Mines, Wawa

INTRODUCTION

The permanent staff of the Sault Ste. Marie Resident Geologist's Office consists of E.J. Leahy, Resource Geologist, Brenda Fremlin, Secretary, and G. Bennett, Resident Geologist. The Drill Core Library program continued under the immediate direction of J.P. Donald.

In January 1987, the Ministry of Northern Development and Mines, Mines and Minerals Division opened a Resident Geologist's office at Wawa with D.J.J. Tortosa as Resident Geologist. The boundaries of the Wawa Resident Geologist's office and the new boundaries of the Sault Ste. Marie Resident Geologist's office are shown on Figure 9.1.

RESIDENT GEOLOGIST'S OFFICE STAFF ACTIVITIES

The total staff at the Resident Geologist's Office varied from 15 to 19 during 1986. As a result, much of the Resident Geologist's time was directed to administrative matters. Much time was also spent responding to ministry, industry, and public inquiries, which remained at a relatively high level in 1986.

The Resident Geologist was a member of a working group set up to provide advice on some aspects of proposed administrative structures for the Mines and Minerals Division of the Ministry of Northern Development and Mines.

The Resident Geologist led two field trips through the Elliot Lake area during the summer of 1986. Fourteen visits were made to active mineral-exploration projects in the Wawa and Batchawawa areas. Eight inactive mineral occurrences were examined.

A few weeks in January 1986 were spent on the continuation of a study of the lower Huronian stratigraphy and Huronian volcanic rocks between Elliot Lake and Sault Ste. Marie.

During the past year the Resource Geologist completed the mine-hazard study at the Municipality of Bruce Mines, the result being to reduce, by about 75 percent, a very large area formerly classified as Mine Hazard Land. Additional areas to be fenced were located, and seven other sites outside the municipal boundaries were investigated. This project involved considerable contacts by mail, phone, or in person to archives, libraries, museums, and publication houses to try to locate data on these old mining operations dating from the middle of the last century.

The Resource Geologist also attended several meetings regarding the microfiche system for assessment files; added new data to the technical articles files; assisted visitors to the Sault Ste. Marie office and responded to inquiries from local prospectors, industry, and the public; and made minor changes to the Geoscience Data Inventory Folio's (GDIF) page formats.

The GDIF program continued in 1986. L. Ashick, T. Howson, J. Melisek, and W. Wing were employed on contract to compile Geological Data Inventory Folios of the Wawa-Goudreau area under the supervision of E.J. Leahy. Dorothy Genys was employed as data-entry operator.

GDIF's for the following townships have been compiled and should be released early in 1987: the townships of Abotossaway, Albanel, André, Bailloquet, Bostwick, Casson, Chabanel, Chapais, Charbonneau, Dablon, Dahl, Dambrossio, Davieaux, Deroche, Desbiens, Dulhut, Esquega, Fenwick, Franchere, Gapp, Groseilliers, Hambleton, Havilland, Jackson, Johns, Jollineau, Keating, Killins, Kincaid, Knicely, Lalibert, Lastheels, LeCaron, Leclaire, Legarde, Lendrum, Levesque, Macaskill, Magone, Marsh, Matthews, McParland, Meath, Menzies, Nahwegezhic, Nicolet, Odlum, Otter, Palmer, Poulin, Rennie, Runnalls, Ryan, St. Germain, Sagard, Sayer, Schembri, Stover, Tolmonen, Tronsen, Varley, Vibert, Warpula, Way-White, Wlasy; and NTS areas Abbie Lake Area, Camp Lake Area, David Lake Area, Jarvey Lake Area, Mishibishu Lake Area, Michipicoten Island, Pilot Harbour NE, Pilot Harbour NW, Point Isacor, and Pukaskwa River Area.

A study of magnetic and geochemical anomalies and "greenstone" enclaves in the granitic terrain between the Montreal River and the Michipicoten metavolcanic-metasedimentary belt was continued under the direction of D.J.J. Tortosa with the assistance of E.J. Haley.

The Sault Ste. Marie Industrial Minerals Program continued under the supervision of J.J. Kral, assisted by P. Beach during the field season. The emphasis was on building stone during the 1986 field season.

The preliminary results for these two preceding projects are included in this report.

J. Lucuik assisted with computer-data entry under the Experience '86 program during July and August.

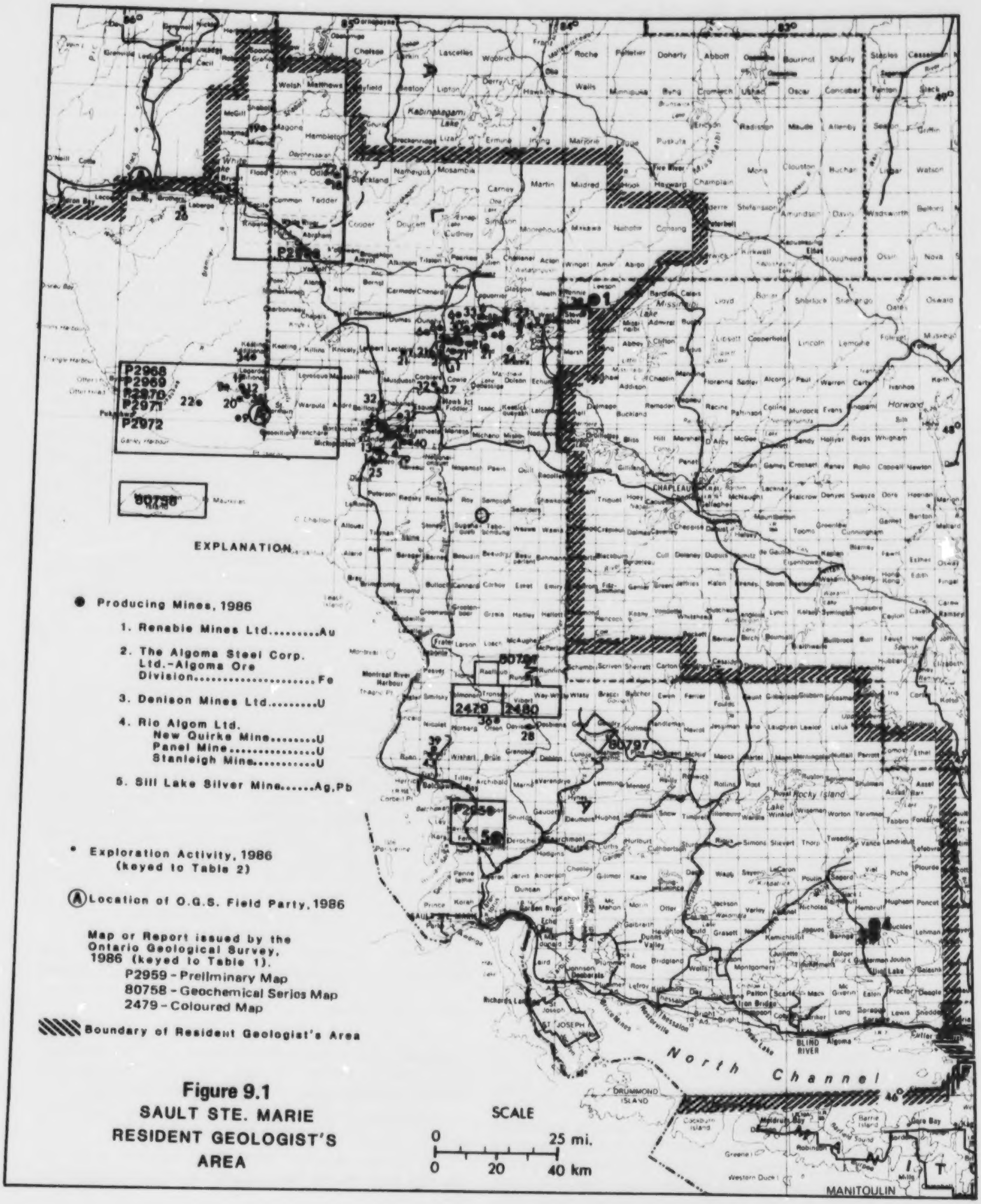
EXPLANATION
● Producing Mines, 1986
1. Renable Mines Ltd..........Au
2. The Algoma Steel Corp. Ltd.-Algoma Ore Division......................Fe
3. Denison Mines Ltd..........U
4. Rio Algom Ltd.
New Quirke Mine.........U
Panel Mine................U
Stanleigh Mine............U
5. Sill Lake Silver Mine......Ag,Pb
• Exploration Activity, 1986 (keyed to Table 2)
Ⓐ Location of O.G.S. Field Party, 1986
Map or Report issued by the Ontario Geological Survey, 1986 (keyed to Table 1).
P2959 - Preliminary Map
80758 - Geochemical Series Map
2479 - Coloured Map
▨ Boundary of Resident Geologist's Area
SCALE
0 25 mi.
0 20 40 km
North Channel
CHAPLEAU
BLIND RIVER
MANITOULIN
DRUMMOND ISLAND
ST. JOSEPH ISLAND
P2968
P2969
P2970
P2971
P2972
P2959
80798
80797
2479
2480

Figure 9.1
SAULT STE. MARIE RESIDENT GEOLOGIST'S AREA

CLAIM STAKING ACTIVITY

Between January 1 and November 30, 1986, 1931 mining claims were staked and recorded in the Sault Ste. Marie Mining Division. This compares to 1603 mining claims staked during the same period in 1985.

MINING ACTIVITY

The Algoma Ore Division of The Algoma Steel Corporation Limited continued to mine siderite iron ore at the George W. MacLeod Mine in Wawa during 1986, except during a five-week shutdown between August and early September. Production for 1986 through to the end of November was 1.11 million long tons of iron sinter from 1.43 million long tons of ore.

Denison Mines Limited continued production of uranium oxide from its mine and mill at Elliot Lake. Denison's production for the first half of 1986 was 2 662 000 pounds of uranium oxide, a 12 percent reduction over the previous year, reflecting a slightly lower delivery commitment (Six Months Report of Denison Mines Ltd., 1986).

Rio Algom Limited continued operation of the Quirke, Stanleigh, and Panel mines in the Elliot Lake area. In 1986, Rio Algom's contract with Ontario Hydro was ammended to reflect Hydro's oversupply problem. The Canadian Mining Journal of November, 1986, made the statement: "Most of the changes are temporary and pertain primarily to a deferral of deliveries through to 1993 and to Ontario Hydro's right to terminate the contract on five years notice."

In the Spring of 1986, Sill Lake Silver Mine Limited resumed mining and milling operations at the former Prace Mine in Vankoughnet Township. Development included the extension of the ramp system, an additional 300 feet, and modifications to the 120 tpd capacity mill constructed in 1985. About 22 tons of lead-silver concentrate were shipped in 1986. The mine is operated by Elsadon Explorations Limited, a privately owned corporation.

EXPLORATION ACTIVITY

Mineral exploration in the Sault Ste. Marie Mining Division continued at a relatively high level, mostly for gold. Base-metal prospects rarely received attention, unless there was known associated precious metals.

Table 9.1 summarizes the exploration activity in the Sault Ste. Marie Mining division during 1986.

GOLD

Gold exploration, fueled in several cases by successful "flow-through" financing, helped to maintain a relatively high level of exploration in the Michipicoten and Batchawawa "greenstone" belts.

Gold continued to be the main exploration target in the Wawa-Goudreau area in 1986. More than 45 programs are known to have been active at least part of the year; 43 are identified on Table 9.1 and Figure 9.1. Much of the exploration in the Goudreau and Mishibishu Lake areas has been stimulated by the continued success resulting from three advanced exploration programs in those areas (see below). Additional major activities also are highlighted below.

Canamax Resources Incorporated completed a spiral ramp with drifts at two levels, for a total of 1155 m of underground development at its Kremzar Gold Prospect in Finan Township. Additional exploration included diamond-drilling underground (7900 m) and on surface (5600 m). Drill-indicated reserves are 1.1 million tons of ore at a grade of 0.235 ounce gold per ton (The Northern Miner, 22nd September, 1986). A production decision is expected in 1987. The project is a joint venture with Kremzar Gold Mines Limited (79 percent controlled by Algoma Steel Corporation Limited).

Muscocho Explorations Limited opened a decline more than 400 m long and continued an extensive surface diamond-drilling program at a cost of $2.5 million at the Magino property in Finan Township. Drill-indicated ore reserves are 1 066 836 tons at 0.25 ounce gold per ton (The Northern Miner, 10th November, 1986). Exploration continues, and a production decision expected in 1987. The project is a joint venture with McNellen Resources Incorporated.

Muscocho Explorations Limited continued extensive exploration of the Magnacon prospect in the Mishibishu Lake area, facilitated by the completion of an access road from Highway 17. More than 500 m of decline development has been completed, in addition to extensive diamond-drilling. Expenditures for 1986 were $3.0 million. Drill-indicated reserves are 647 769 tons at 0.22 ounce gold per ton or 1 032 435 tons at 0.156 ounce gold per ton (The Northern Miner, 29th September, 1986). Exploration is continuing. A production decision expected in 1987 from the exploration partnership that includes Flanagan McAdam Resources Incorporated (50 percent) and Windarra Minerals Limited (25 percent). Granges Exploration Limited conducted an extensive geophysical, geochemical, and diamond-drilling program on its Mishibishu Lake area joint-venture prospect with MacMillan Energy Corporation. More than 85 holes were drilled. Encouraging drill intersections reported include 0.312 ounce gold per ton over 14.5 feet, 0.157 ounce gold per ton over 12.11 feet, 0.192 ounce gold per ton over 5 feet, and 0.266 ounce gold per ton over 12.8 feet (The Northern Miner, November, 1986). Further work is planned for 1987.

Noranda Exploration Company Limited completed sixteen drillholes on the Cline Lake prospect in Jacobson Township. Assays ranged from 0.023 to 1.454 ounces gold per ton and one intersection was 0.297 ounce gold per ton over 10.4 feet (The Northern Miner, 3rd November, 1986). Additional work is in progress. The project is a joint venture with Cline Development Corporation.

On the adjacent Markes Prospect, Esso Minerals Canada completed fifteen diamond-drill holes for a total length of >5000 feet. Significant assay results reported include: 0.139 ounce gold per ton over 38.8 feet, 0.157 ounce gold per ton over 45.5 feet, 0.366 ounce gold per ton over 16 feet, and 0.238 ounce gold per ton over 14.8 feet (The Northern Miner, 17th November, 1986). Drilling will continue. The project is also a joint venture with Cline Development Corporation.

In the Wawa area, Citadel Gold Mines Incorporated began a feasibility study of the past pro-

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 9.1

Number on Figure	Individual or Company	Activity
1.	BRIDGET LAKE RES. INC.	STRIPPING, TRENCHING, RABAZO TWP.
2.	C.W. CAMPBELL	STRIPPING, TRENCHING, WEST TWP.
3.	CANAMAX RES. INC./KREMZAR G. MS.	GEOLOGICAL SURVEY, DIAMOND DRILLING, UNDERGROUND DEVELOPMENT, FINAN, AGUONIE AND JACOBSON TWPS.
4.	CITADEL GOLD MNS. INC.	UNDERGROUND DEVELOPMENT, MCMURRAY TWP.
5.	G. CLEMENT	GEOPHYSICAL SURVEY, TRENCHING, RIGGS TWP.
6.	CLINE DEVELOPMENT CORP.	STRIPPING, TRENCHING, DUNPHY, FINAN, JACOBSON TWP.
7.	CONQUEST YELLOWKNIFE RES. LTD.	GEOPHYSICAL, GEOLOGICAL SURVEY,STRIPPING, TRENCHING, DIAMOND DRILLING, RIGGS & STOVER TWP.
8.	CYMBAL RES. CORP.	DIAMOND DRILLING, JACOBSON TWP.
9.	DOMINION EXPLORERS INC.	GEOPHYSICAL, GEOLOGICAL SURVEYS, DIAMOND DRILLING, MISHIBISHU LAKE AREA
10.	EMERALD LAKE RES. INC.	GEOPHYSICAL SURVEY, LABERGE TWP.
11.	ESSO MINERALS CANADA/CLINE DEVE. CORP.	STRIPPING, DIAMOND DRILLING, JACOBSON TWP.
12.	FLANAGAN MCADAM RES.INC.(50%) MUSCOCHO EXP. LTD. (25%) WINDARRA MINERALS LTD. (25%)	DIAMOND DRILLING, UNDERGROUND DEVELOPMENT, MISHIBISHU LAKE AREA
13.	HERB FUNK	STRIPPING, TRENCHING, DIAMOND DRILLING, LENDRUM TWP.
14.	DANIAL GIGNAC	GEOPHYSICAL SURVEY, TRENCHING, ABOTOSSAWAY & AGUONIE TWP.
15.	GOLDUN AGE RESOURCES INC./DUNRAINE MS. LTD.	UNDERGROUND DEVELOPMENT, MCMURRAY TWP.
16.	GRANGES EXPLORAYION LTD.	DIAMOND DRILLING, RUNNALLS TWP.
17.	GRANGES EX. LTD./MACMILLAN ENERGY CORP.	GEOPHYSICAL, GEOCHEMICAL SURVEYS, DIAMOND DRILLING, MISHIBISHU LAKE AREA
18.	LLOYD HALVERSON	PROSPECTING, STRIPPING, TRENCHING, ODLUM TWP.
19.	DAVID HUDSON	PROSPECTING, SHABOTIK TWP.
20.	HUSSEY GEOPHYSICS INC.	GEOPHYSICAL SURVEY, ST. GERMAIN TWP.
21.	INTERNATIONAL CORONA RES. LTD.	GEOPHYSICAL, GEOCHEMICAL, GEOLOGICAL SURVEYS, TRENCHING, DIAMOND DRILLING MUSQUASH, LECLAIRE, ABOTOSSAWAY, AGUONIE, BIRD TWPS.
22.	HAROLD JONES	GEOPHYSICAL, GEOCHEMICAL SURVEYS, PUKASKWA RIVER AREA
23.	JUNIOR MINE SERVICES LTD.	TRENCHING, DIAMOND DRILLING, RIGGS TWP.
24.	KINGSWOOD EXP. 1985 LTD./BELMORAL MINES LTD.	GEOPHYSICAL, GEOLOGICAL SURVEYS, BRUYERE TWP.
25.	STAN KUSTEC	STRIPPING, TRENCHING, RABAZO TWP.
26.	LAC MINERALS LTD.	STRIPPING, DIAMOND DRILLING, BROTHERS & LABERGE TWP.
27.	MASCOT GOLD MINES LTD.	PROSPECTING, GEOLOGICAL SURVEY, ODLUM & HAMBLETON TWPS.
28.	MASSIVE ENERGY CORP.	DRILLING, GEOCHEMICAL SURVEY, DAVIEAUX TWP.
29.	MONK GOLD & RESOURCES LTD.	DIAMOND DRILLING, UNDERGROUND DEVELOPMENT, RABAZO TWP.
30.	MUSCOCHO EX.LTD./MCNELLEN RES. INC.	GEOLOGICAL SURVEY, DIAMOND DRILLING, UNDERGROUND DEVELOPMENT, FINAN TWP.
31.	NAREX ORE SEARCH CONSULTANTS INC.	DIAMOND DRILLING, BOMBY TWP.
32.	NORANDA EX. CO. LTD.	GEOPHYSICAL, GEOLOGICAL SURVEYS, STRIPPING, TRENCHING, DIAMOND DRILLING, CHABANEL, MCMURRAY, CORBIERE, BAILLOQUET, LENDRUM TWPS.

TABLE 9.1 Continued

Number on Figure	Individual or Company	Activity
33.	NORANDA EX. CO. LTD.	GEOLOGICAL SURVEY, TRENCHING, JACOBSON TWP.
34.	NORWEST CON DRILLING	DIAMOND DRILLING, ABBIE LAKE AREA
35.	PROSPECTING GEOPHYSICS	DIAMOND DRILLING, MISHIBISHU LAKE AREA
36.	RAMPART RESOURCES LTD.	GEOPHYSICAL, GEOCHEMICAL SURVEY, DRILLING, OLSON AND TRONSEN TWP.
37.	REED LAKE EX. LTD.	TRENCHING, CORBIERE & ESQUEGA TWPS.
38.	ROYEX GOLD MINING CORP.	GEOPHYSICAL, GEOCHEMICAL, GEOLOGICAL SURVEYS, TRENCHING, DIAMOND DRILLING,RENNIE, LEESON, STOVER TWPS.
39.	ROY RUPERT	GEOPHYSICAL SURVEY, PALMER TWP.
40.	RYERSON RESOURCES	AIRBORNE GEOPHYSICAL SURVEY, MCMURRAY TWP.
41.	SEYMOUR SEARS & CO.	GEOPHYSICAL, GEOLOGICAL SURVEY, MCMURRAY TWP.
42.	SEYMOUR SEARS & CO./DANRA RES. LTD.	GEOPHYSICAL SURVEY, MCCRON & LABERGE TWPS.
43.	JIM WATKINS	AIRBORNE GEOPHYSICAL SURVEY, PALMER TWP.

ducer Citadel (Pango, Pursides, Surluga) Mine in McMurray Township (Wawa). Dewatering has progressed to the third level and an extensive $800 000 program of underground and surface exploration is planned. Estimated ore reserves are 2.6 million tons at 0.19 ounce gold per ton, cut and diluted (The Northern Miner, 6th October, 1986).

Goldun Age Resources Incorporated completed an underground exploration program on the past producer Parkhill Mine in McMurray Township, Wawa area. Seven levels were dewatered, mapped, and sampled. Evaluation of the project is in progress. The project is a joint venture with Dunraine Mines Limited (J. Tilsley, Consultant for Goldun Age Resources Incorporated, personal communication, 1986).

Monk Gold and Resources Limited completed 14 760 feet of surface diamond-drilling on 38 holes and opened a 360-foot decline/adit on its Rabazo Township prospect in the Wawa area. Gold mineralization of varying grades has been reported from 24 of the drillholes. (The Northern Miner, 12th May, 1986). Additional work is planned for 1987.

Rampart Resources Limited holds an option on 244 unsurveyed claims in Olsen and southern Tronsen Township in the Batchawana area, about 45 miles (72 km) north of Sault Ste. Marie. In 1986, Rampart Resources Ltd. carried out a detailed geochemical survey (B-horizon soil), prospecting, and some fill-in geological mapping over parts of a pyritic iron formation. This formation has been traced for a distance of five miles in a roughly east-west direction from the Massive Energy Limited ground adjoining to the east.

A 3100-foot drill program was completed in the spring and summer of 1986 to test ground-geophysical and geochemical anomalies located by 1985 surveys. The company reported that the best intersection was 4.1 feet of 0.525 ounce gold per ton. Another hole intersected 10.1 feet of 0.048 ounce gold per ton (George Cross News Letter, October 20, 1986). In late November of 1986, a 2500-foot drill program was begun to test the recently discovered gold occurrence.

In 1986, Massive Energy Limited continued work on the Hammer-Bridge option in Davieaux Township in the Batchawana area. A 4500-foot program of close-spaced diamond-drilling was completed on the Mine Pond showing. Some detailed geochemical surveys, prospecting, and 30 m of trenching was done on the Horseshoe Pond showing, also on the Hammer-Bridge option group.

Massive Energy Limited, in cooperation with Master Resources and Development Limited, carried out an airborne geophysical survey of parts of their respective claim groups in Davieaux Township.

Granges Exploration Limited carried out an 18-hole, 3000-foot diamond-drilling program in the Montreal River area in March and April of 1986. The holes were drilled to test a series of anomalies detected by a ground electromagnetic survey conducted during the winter of 1986. A limited ground follow-up geochemical survey and additional drilling was carried out during the Fall of 1986.

PLATINUM

David Hudson of Wawa is prospecting a four-claim platinum discovery in Shabotik Township. Platinum group element analyses up to 620 ppb platinum (Pt) and 650 ppb palladium (Pd), and 9100 ppm copper (Cu), 4200 ppm nickel (Ni) were obtained by the District Geologist from a varied-textured quartz gabbro melanosome of a tonalitic gneiss-migmatite (Geoscience Research Laboratories, Ontario Geological Survey, Toronto).

SAULT STE. MARIE DRILL CORE STORAGE LIBRARY by J.P. Donald

Staff for the Sault Ste. Marie Core Library for 1986 included D. Messenger and M. Gaudreau as geological technicians, R. Sanderson as a summer assistant, and J. Donald.

The total drill-core inventory as of November 30, 1986, was 59 000 m. Approximately 8000 m of core was collected, catalogued, and stored in 1986, representing 12 000 m of drilling from 12 different projects.

A donation of approximately 2200 rock specimens from R.P. Sage and P. Born (Geologists, Precambrian Geology Section, OGS, Toronto) augmented the 30 000 samples in storage from previous OGS mapping projects in the region.

Work continued on the compilation of a computer database for 2000 thin sections, 1500 mine plans and sections, 7000 rock specimens, and 900 newspaper clippings.

In early 1987, the current Sault Ste. Marie Resident Geologist's Region will be subdivided to form the Wawa Resident Geologist's Region. The Sault Ste. Marie Core Library will remain as the repository for core from both regions.

An inventory catalogue of drill core stored at the Drill Core Library is available through the Sault Ste. Marie Resident Geologist's Office.

WAWA STAFF GEOLOGIST ACTIVITIES by E. Frey

The Wawa office continued its second year of operation in 1986. On April 1, the office moved to a new location on Mine Road, adjacent to Wawa Lake. Office renovations in November have improved facilities in preparation for the expansion of staff and activities in consequence of the formation of a new Resident Geologist area and the appointment of a Resident Geologist on January l, 1987.

In 1986, permananent staff consisted of E.D. Frey, Staff Geologist. Summer field assistance was provided by R.W. Summers, employed under the Northern Internship Program of the Ministry of Northern Development and Mines. Clerical and office assistance was provided by T.A. Jerrard, G.A. Greenwood, and T.A. Hoffmann.

The primary activities continued to be providing information services and technical advice on request to prospectors and geologists from the exploration, academic, and government communities, as well as the general public. A significant facet of these services was conducting 38 organized and impromptu field trips covering all aspects of Wawa-area geology. Office and telephone consultations also were significant elements of public service, totaling 663 from January through November. Sampling and preliminary examination of eleven new occurrences and dormant or developing prospects provided additional assistance to prospectors and updated the Wawa mineral exploration database. The District Geologist also visited 12 major exploration projects.

Other field activities included fostering community geological education and mineral exploration awareness by conducting field trips for three Wawa Grade 7 and 8 elementary school classes and one Grade 11 high-school geology class; presenting introductory geological lectures to three Ministry of Natural Resources Junior Ranger camps; a reconnaissance of the north contact zone of the Michipicoten Greenstone Belt and its enveloping granitic terrain; preparation for the 1987 Institute on Lake Superior Geology (hosted by the Wawa office); and a Quaternary field trip for the 1987 International Union for the Study of the Quaternary (INQUA).

External conferences and field trips attended included: an Ontario Geological Survey— industry field trip to the Fleck Platinum Prospect near Marathon; Prospectors and Developers Association; OGS Building Stone Seminar, and OGS Geoscience Seminar, all in Toronto. At the latter event, the District Geologist exhibited a poster titled "Exploration Developments and Prospects, Wawa District."

CURRENT RESEARCH IN THE WAWA AREA

P. Blomberg, University of Toronto, B.Sc. candidate, is studying olivine diabase dikes in the Mishibishu Lake area. J. Ho, University of Toronto, B.Sc. candidate, is studying the diabase dikes of the Mishibishu Lake area. G.E. McGill, University of Massachusetts faculty, continued structural studies in Chabanel Township. D. Pommanville, University of Windsor, B.Sc. candidate, is studying sedimentary rocks of Mishibishu Lake area. R.G. Reid, University of Windsor, M.Sc. candidate, continued a study of volcanic stratigraphy and geochemistry in the Mishibishu Lake area. B. Rivard, Washington University, St. Louis, Ph.D. candidate, began a remote sensing study in Chabanel Township. C.H. Shrady, University of Massachusetts, Ph.D. candidate, completed structural studies in Chabanel Township.

ALGOMA RECONNAISSANCE GEOLOGY PROJECT by D.J.J. Tortosa

INTRODUCTION

The Algoma Reconnaissance Geology Project continued into its third and final year, concentrating on the area between the Michipicoten and the Terrace Bay-Hemlo metavolcanic-metasedimentary belts (Figure 9.2). The project was initiated in order to evaluate the source and nature of selected geological, geochemical, and geophysical anomalies within the granitic and gneissic terrains of the Algoma Region, and to determine whether these represented targets of possible economic interest for the mining and exploration community.

Targets to be evaluated were based on aeromagnetic, geochemical, and geological anomalies define by previous federal and provincial surveys. Much o the area can be accessed by primary and secondar highways and by a complex system of logging road This logging road network also lent itself well This logging road network also lent itself well t detailed reconnaissance geological mapping in th Danny Lake and Kwinkwaga Lake areas (Figures 9 and 9.4) at a scale of 1 inch to 1/4 mile (1:15 84 and 1 inch to 1/2 mile (1:31 680), respectively. Th map areas contain a number of metavolcani metasedimentary enclaves, northeast-and northwe trending aeromagnetic anomalies, and two mine occurrences. Field work, under the supervision of Tortosa assisted by E. Haley, was based out of t Ministry of Natural Resources Silvicultural camp Crocker Lake, just outside White River.

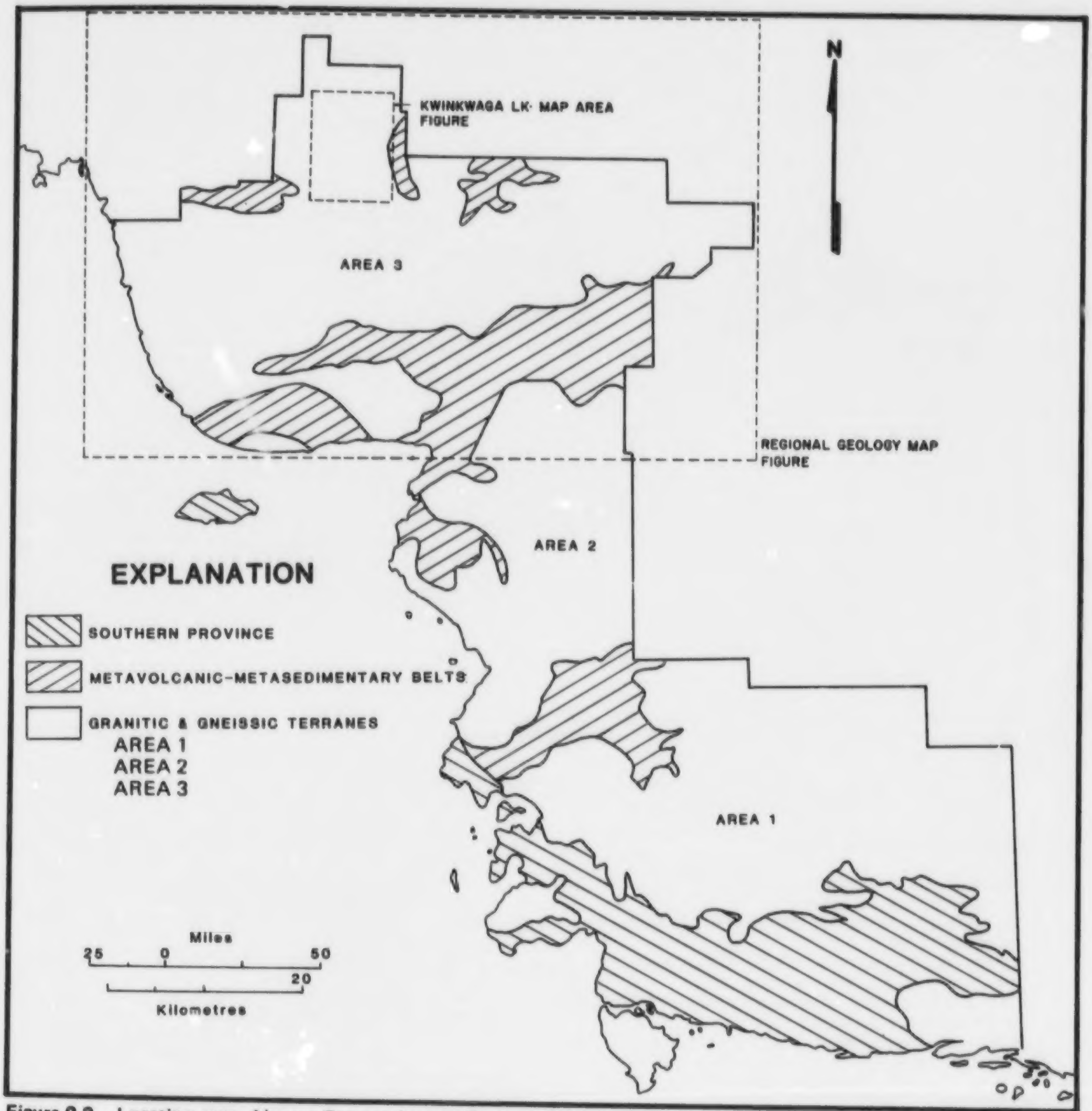
N
KWINKWAGA LK· MAP AREA FIGURE
AREA 3
REGIONAL GEOLOGY MAP FIGURE
AREA 2
AREA 1
EXPLANATION
SOUTHERN PROVINCE
METAVOLCANIC-METASEDIMENTARY BELTS
GRANITIC & GNEISSIC TERRANES
AREA 1
AREA 2
AREA 3
Miles
25
0
50
20
Kilometres

Figure 9.2. Location map, Algoma Reconnaissance Geology Project

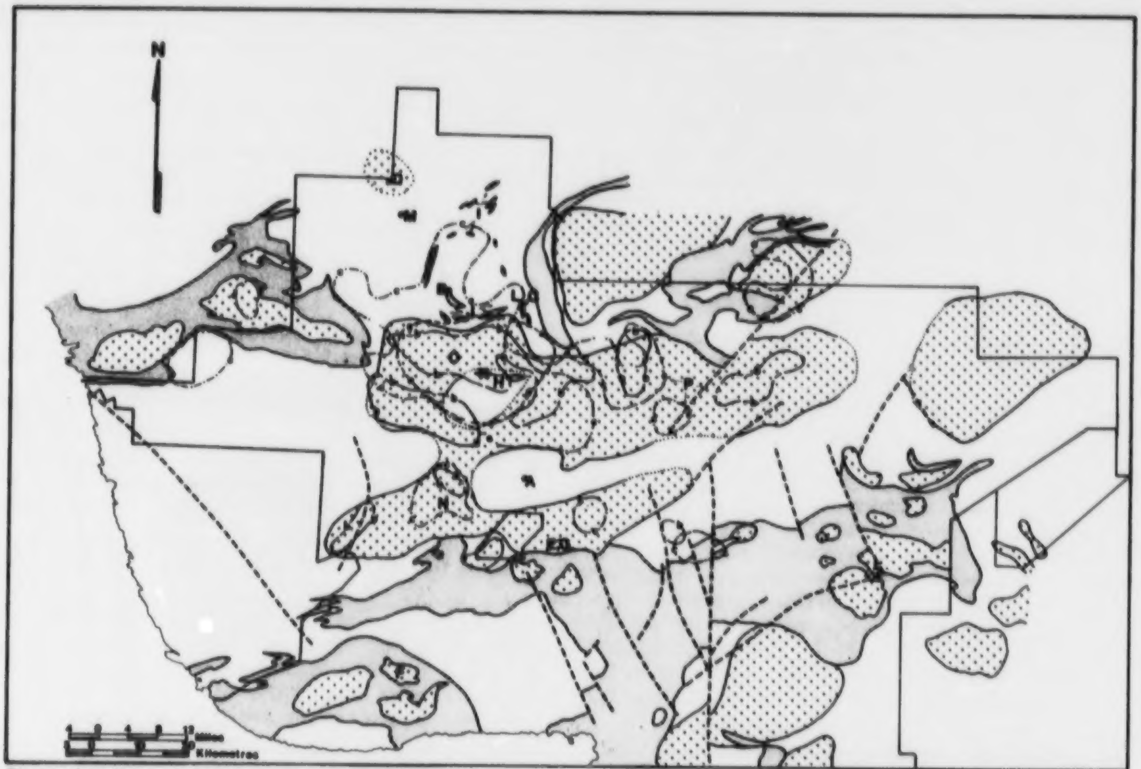

Figure 9.3 General Geology of Area 3 showing the areas visited; Shaded areas represent the outlines of metasedimentary and metavolcanic belts and enclaves, crosses indicate felsic plutonic terrain, blank areas represent tonalitic to granodioritic gneisses.

TARGETS AND ANOMALIES EXAMINED IN 1986

AEROMAGNETIC ANOMALIES

A: (3M-1) NEGWAZU LAKE AEROMAGNETIC ANOMALY (GABBRO DIKE)
B: (3M-2) CADDY CREEK AEROMAGNETIC ANOMALY (AMPHIBOLITE)
C: (3M-3) HALVERSON'S SULPHIDE OCCURRENCE (MAGNETITE-SULPHIDE IRONSTONE)
D: (3M-4) BULLDOZER LAKE AEROMAGNETIC ANOMALY (HORNBLENDE DIORITE)
E: (3M-5) FUNGUS LAKE ANOMALY (QUARTZ DIORITE)
F: (3M-6) MISHIBISHU LAKE STOCK (SYENITE)*

GEOLOGICAL TARGETS

G: (3G-1) FUNGUS LAKE DIORITE
H: (3G-2) HIGHWAY 631 METAVOLCANIC-METASEDIMENTARY ENCLAVES
I: (3G-3) NORTHERN GREENSTONE ENCLAVE CLUSTER
J: (3G-4) SOUTHERN GREENSTONE ENCLAVE CLUSTER

MINERAL OCCURRENCES

K: (3S-1) HIGHWAY 631 MOLYBDENITE OCCURRENCE
L: (3S-2) HALVERSON'S SULPHIDE OCCURRENCE
M: (3S-3) PLATINUM GROUP METAL OCCURRENCE

REGIONAL GEOCHEMICAL ANOMALIES

N: (3SSM-1) POKEI LAKE
O: (3SSM-2) WHITE RIVER
P: (3SSM-3) ANAHAREO LAKE - OBA LAKE

URANIUM IN LAKE WATER

a: >0.65 ppb U or >98 %tile
(X+2S = 0.52 ppb)

URANIUM IN LAKE SEDIMENT

b: >20 ppm U or >95 %tile
(X+2S = 20 ppm U)

FLUORINE IN LAKE WATER

c: >54 ppb F or >90 %tile
(X+2S = 68 ppb F)

* indicates anomaly noted in the text.

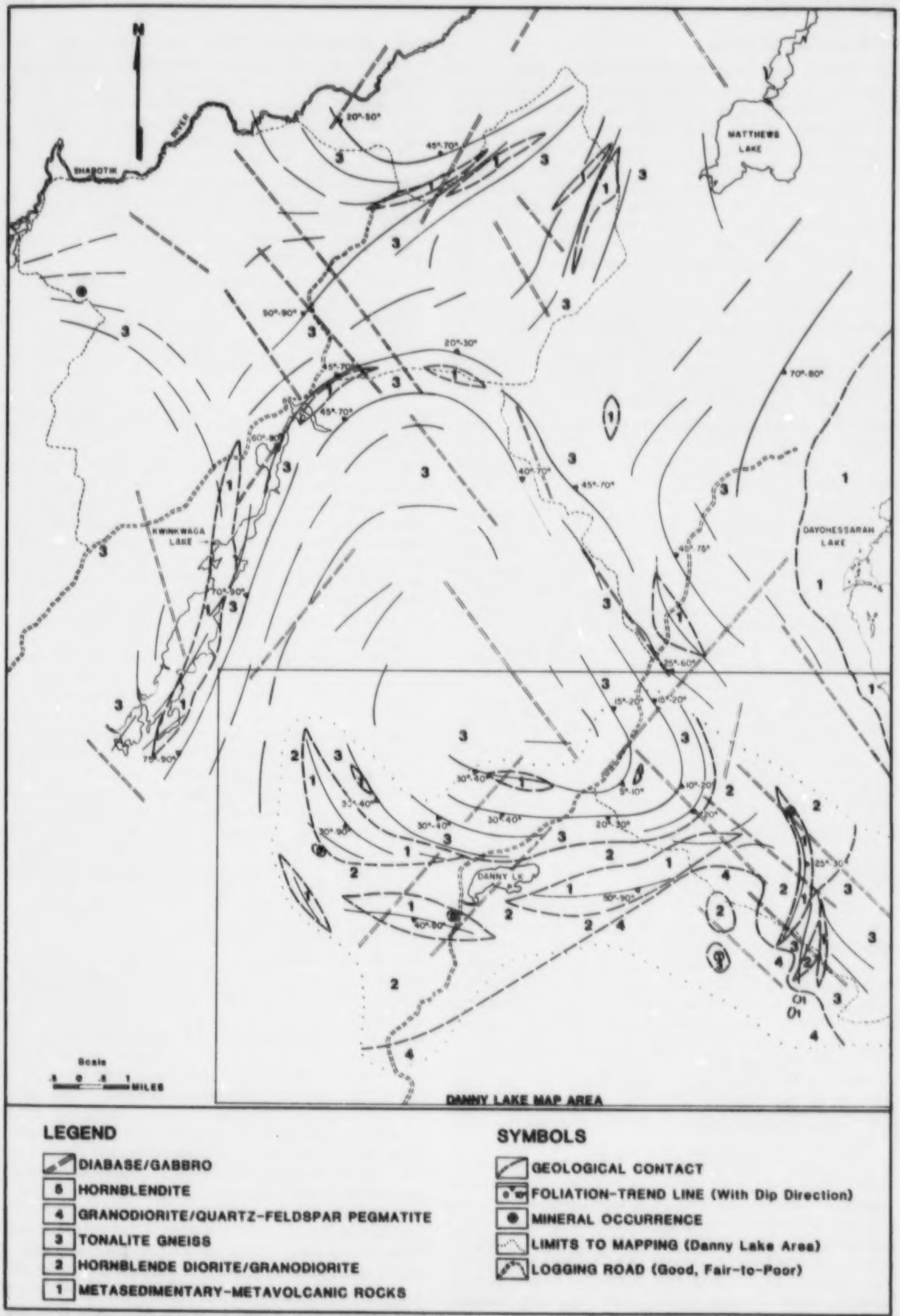
N
SHABOTIK RIVER
MATTHEWS LAKE
KWINKWAGA LAKE
DAYONESSARAH LAKE
DANNY LK
DANNY LAKE MAP AREA
20°-50°
45°-70°
50°-90°
20°-30°
45°-70°
45°-70°
60°-80°
40°-70°
45°-70°
70°-80°
40°-75°
70°-90°
75°-90°
25°-60°
15°-20°
15°-20°
30°-40°
30°-90°
30°-40°
30°-40°
20°-30°
5°-10°
10°-20°
20°
25°-30°
50°-90°
40°-50°
1
2
3
4
Scale
.5 0 .5 1 MILES
LEGEND
DIABASE/GABBRO
5 HORNBLENDITE
4 GRANODIORITE/QUARTZ-FELDSPAR PEGMATITE
3 TONALITE GNEISS
2 HORNBLENDE DIORITE/GRANODIORITE
1 METASEDIMENTARY-METAVOLCANIC ROCKS
SYMBOLS
GEOLOGICAL CONTACT
FOLIATION-TREND LINE (With Dip Direction)
MINERAL OCCURRENCE
LIMITS TO MAPPING (Danny Lake Area)
LOGGING ROAD (Good, Fair-to-Poor)

Figure 9.4. Reconnaissance geology of the Kwinkwaga Lake and Danny Lake Areas.

GEOLOGICAL SETTING

The granitic and gneissic terranes throughout Area 3 (Figure 9.2) are shown on Geological Compilation Map 2220 (Milne *et al.* 1972) as consisting of granitic, granodioritic, dioritic, and trondhjemite gneisses and massive granitic rocks containing small isolated metavolcanic-metasedimentary enclaves. Portions of the granitic and gneissic rocks have been mapped as part of 1 inch to 1/4 mile (1:15 840) mapping of the metavolcanic and metasedimentary belts throughout the area by Fenwick (1967), Siragusa (1977, 1978), Muir (1982), Riley (1971), Giguere (1972), and Bennett *et al.* (1977).

The area is transected by north-, northeast-, and north-northwest-trending lineaments, and by northwest- and northeast-trending diabase dikes. Card (1979), in a regional geological synthesis of the Central Superior Province, includes the area in the White River Plutonic Domain which consists predominantly of tonalitic gneisses intruded by large felsic plutons.

FIELD INVESTIGATIONS

Several regional geochemical anomalies of uranium and fluorine are defined by elevated levels of uranium in lake sediments and waters and by elevated levels of fluorine in lake waters (Ontario Geological Survey-Geological Survey of Canada 1979a, 1979b). The regional geochemical anomalies are thought to reflect the presence of large felsic plutons in the central part of the area (3SSM-1, 2, 3, *see* Figure 9.3). Background radioactivity (total count) is generally three to four times more in the plutonic rocks than in the enclosing tonalitic gneisses (based on in situ spectrometric measurements). Geochemical anomaly 3SSM-1, which has the strongest uranium and fluorine geochemical signatures, is situated over a large mass of medium-grained granodiorite intruded by quartz-feldspar pegmatite veins and masses. The size and shape of the uranium and fluorine geochemical anomalies roughly correlates with the surface extent of the granodiorite mass as determined from road traverses in the area.

Together with several other less well defined uranium and fluorine geochemical anomalies, the elevated uranium and fluorine values roughly outline a felsic-plutonic rock mass of batholithic proportions ranging in composition from granodiorite-trondhjemite to quartz monzonite. The elevated uranium levels in lake sediments and waters may be attributed to the presence of uranium-bearing accessory minerals in the felsic plutonic rocks of the area; the elevated fluorine in lake waters is coincident with the high uranium in lake waters and may be attributed to the presence of fluorine-bearing accessory minerals such as apatite.

The aeromagnetic patterns in the area are dominated by linear northwest- and northeast-trending magnetic ridges reflecting the presence of northwest- and northeast-trending diabase dikes. Similar-trending dikes in the Wawa area have been correlated with the Matachewan swarm (Rb-Sr 2633 Ma; Gates and Hurley, 1973) and the Sudbury swarm (circa 1250 Ma; Van Schmus, 1975). Aeromagnetic anomalies are either due to amphibolite with a high magnetic susceptibility (3M-2, *see* Figure 9.2), or the presence of thin units of magnetite-bearing iron formation (3M-3), and intermediate to mafic intrusives with a high magnetic susceptibility (3M-4). The intermediate to mafic intrusives are characterized by concentric aeromagnetic anomalies caused by the presence of Fe-Ti oxides (3M-4, 3M-5, and 3M-6, *see* Figure 9.2). In the Bulldozer Lake area, a previously unmapped intrusive complex consisting of hornblende diorite and coarse-grained hornblende-plagioclase underlies a concentric aeromagnetic anomaly (3M-4, *see* Figure 9.2).

Three mineral showings exist in the area: a) a molybdenite occurrence on highway 631 (3S-1, *see* Figure 9.2); b) a sulphide occurrence in the Danny Lake area (3S-2, *see* Figure 9.2); and c) a PGE occurrence in Shabotik Township (3S-3, *see* Figure 9.2).

Molybdenite Occurrence, Hwy 631, Abraham Township

This occurrence of molybdenite has not previously been documented in the literature although its existence is known (E. Leahy, Resource Geologist, Sault Ste. Marie, personal communication, 1986). Molybdenite flakes occur at or near the contact between metasediments and an intrusive, flat-lying lens or apophysis of granodiorite (3S-1, *see* Figure 9.3). The molybdenite occurs where the granodiorite begins to pinch out, forming siliceous veins and lenses. The metasedimentary rocks form part of an east-trending, steeply dipping enclave about one kilometre in length and about 500 m wide which is segmented and intruded by granodiorite, diorite, and quartz-feldspar pegmatite. The rocks consist of massive to layered amphibolites, thinly layered siliceous amphibolites, fine-grained, intermediate to felsic, biotite-bearing metasediments, and deformed polymictic breccias or conglomerates. Some of the metasediments contain pyritiferous and biotiferous sections which cause discontinuous iron gossans containing up to 343 ppm copper (Cu), 305 ppm zinc (Zn), but with less than 2 ppb gold (Au) (Geoscience Research Laboratories, Ontario Geological Survey, Toronto).

Cu-Fe-Zn Occurrence, Odlum Township

This prospect has been staked by Mr. Lloyd Halverson, resident of White River and was discovered as a consequence of road-building and stripping by Domtar Limited during their logging operations. The prospect is located in the south-central part of Odlum Township and occurs at the north tip of a north-trending metasedimentary-metavolcanic enclave (3S-2, *see* Figure 9.6) The mineralized zone appears to be a stratiform lens about 450 m long and between 1 and 5 m thick, trending north-northwest and dipping 20 to 30° northeast. The mineralization occurs within a 10 to 20 m thick section of metasediments sandwiched between layered amphibolites which are partly migmatized and intruded by hornblende diorite, late granodiorite, and quartz-feldspar pegmatite. The mineralized lens consists of magnetite-quartz and pyrite-chalcopyrite-quartz, crosscut by veinlets of quartz containing pyrite and chalcopyrite. Analyses of sulphide-mineral-bearing grab samples had up to

470 ppm Cu, 155 ppm Zn, and 2 to 3 ppb Au. It appears that the mineralized zone represents a thin lens of lean iron formation which has undergone metamorphic remobilization-migmatization, with the addition or remobilization of sulphur, copper, and some zinc. Notably, sulphurization of magnetite-bearing iron formation is associated with gold-bearing quartz veins in the Geraldton area, and similar processes may be applicable to Mr. Halverson's prospect.

PGE Occurrence, Shabotik Township

This showing represents the first platinum-group element (PGE) occurrence within the granitic and gneissic terrains of the Algoma Region. The occurrence has been staked by Mr. Daniel Carroll, resident of White River and is located in the south-central part of Shabotik Township (3S-3, *see* Figure 9.3). The mineralization is hosted in a coarse-grained migmatitic rock (diatexite) consisting of hornblende, plagioclase, and quartz, which is exposed over an area 2 to 3 m square, enclosed by layered, medium-to coarse-grained, leucocratic to mesocratic, tonalitic gneisses. The mineralization consists of pyrite, chalcopyrite, and pyrrhotite grains disseminated within the more mafic, amphibole-rich (melanosome) portions of the rock. The mineralization is poorly exposed over an area of about a metre square, and no obvious controls on the mineralization are visible, partly due to the poor trenching. Analyses of mineralized grab samples indicate up to 670 ppb Pt, 580 ppb Pd, and 25 ppb Au. The mineralized rock has a moderate magnetic susceptibility which may be useful in delineating other similarly mineralized rocks in the area. A large, concentric, aeromagnetic anomaly about 5 km in diameter is situated 5 km to the north-northwest of the occurrence in the Bulldozer lake area. The aeromagnetic anomaly overlies anatectic/intrusive rocks of similar composition and textures to those of the PGE occurrence (Figure 9.3).

Reconnaissance Geological Mapping

Two areas of metasedimentary-metavolcanic enclaves occur west of the Dayohessarah Lake Metavolcanic-metasedimentary Belt (Fenwick 1967); a northern "cluster" north and northeast of Kwinkwaga Lake (3G-3 , *see* Figure 9.3), and a southern "cluster" in the Danny Lake area (3G-4 , *see* Figure 9.3). Recent logging activity by Domtar Limited in the Danny Lake area provides excellent access as well as newly uncovered rock exposures in an area dominated by a thick glaciofluvial blanket of sands and gravels. In order to better understand the relationship between the metavolcanic-metasedimentary enclaves and their enclosing host rocks, a detailed reconnaissance survey was initiated in the Danny Lake area at a scale of 1:15 840, utilizing the road and lake networks for access (Figure 9.3). For the Kwinkwaga Lake area, use was made of previous reconnaissance geological data (Fenwick 1967), the geological data from the Danny Lake map area, and, as well, additional reconnaissance traverses were carried out where information was limited.

The regional geology of the Kwinkwaga Lake area is dominated by a large, domal and oval structure, composed predominantly of tonalitic gneiss. The oval structure has a long axis of about 20 km trending northwest, and a short axis of about 12 km trending northeast (Figure 9.4). The structure is defined by foliation-trend lines displaying semicircular, closing loops in the layered and massive tonalitic gneisses and in the enveloping metavolcanic-metasedimentary enclaves. A road traverse across the oval structure revealed a massive, foliated core of tonalite with the flanks consisting of layered and foliated tonalitic gneisses with conformable layers and lenses of amphibolite. Large metavolcanic-metasedimentary enclaves appear to have an arcuate shape and range from 5 to 10 km long and 0.5 to 1 km wide. The enclaves are thought to be lens shaped, wrapped about the outer perimeter of the tonalite gneiss dome in a discontinuous manner but conformable with the layering/foliation in the rocks.

The metavolcanic-metasedimentary enclave "clusters" previously mentioned have been shown on regional maps as being separate and apparently unrelated (Card 1981; Fenwick 1967). The present survey, however, has shown that these enclave "clusters" are connected and can be traced around the outer margin of a tonalitic-gneiss dome. They appear to reflect a deeper structural level of what originally was a more extensive greenstone belt in the area. Within this structural context, the Dayohessarah Metavolcanic-metasedimentary Belt may represent the tight, synformal, highly deformed, and metamorphosed "root" or "keel" of a once more extensive greenstone belt.

Detailed mapping in the Danny Lake area indicates large areas underlain by a medium-to coarse-grained, leucocratic to mesocratic, hornblende diorite to hornblende granodiorite which intrudes and encloses many of the metavolcanic-metasedimentary enclaves in the area. The hornblende diorite varies from feldspar rich to hornblende rich, and in places is difficult to distinguish from migmatized amphibolite. Although most of the contact between the hornblende diorite and the layered tonalitic gneisses to the northwest is overburden covered, contacts in the southeastern part of the map area suggest an intrusive relationship. The area encompassed by hornblende diorite has a crescent shape, roughly concordant with the southeastern lobe of the tonalite gneiss dome, and generally occupies the area between the tonalitic gneisses and the supracrustal rocks of the Dayohessarah Lake area.

Many of the characteristics of granitoid complexes outlined by Schwerdtner *et al.* (1979) are applicable to the granitic and gneissic terrains of the region and, specifically, to the Kwinkwaga Lake and Danny Lake areas. Some of these characteristics are as follows: a) the tonalite-gneiss dome displays a transition from a foliated tonalite core to a marginal zone composed of layered, amphibolitic tonalite gneiss containing arcuate-shaped metavolcanic-metasedimentary enclaves; b) a crescent-shaped pluton of hornblende-diorite composition occupies a quasi-concordant site between the gneissic dome and the adjacent Dayohessarah Lake supracrustal belt; c) the Dayohessarah metavolcanic-metasedimentary belt, with its synformal structure, may represent the infolding of metavolcanic-metasedimentary rocks by the diapiric emplacement of the enclosing granitoid rocks; d) a large batholith, ranging in composition from quartz monzonite to granodiorite, occupies the central portion of the granitoid terrain in the study area and represents a post-tectonic period of emplacement. It is similar to the "central batholiths" described by Schwerdtner *et al.* (1979) in the granitic and gneissic terrains of the Atikokan area in northwestern Ontario.

An Open File Report to be submitted by the end of March 1987 will consist of two regional-scale maps at 1:253 440; one showing the locations visited, geochemical anomalies, and geological data, and a second showing geological and aeromagnetic data. Areas where reconnaissance geology was focused will be presented on a 1:15 840 scale map of the Danny Lake Map Area and on a 1:31 680 scale map of the Kwinkwaga Lake Map Area (Figures 9.3 and 9.4). The report will also include a reinterpretation of the generalized regional geology of the granitic and gneissic terrains in the Wawa District.

INDUSTRIAL MINERALS, BUILDING, AND ORNAMENTAL STONES by J.J. Kral

The 1986 field season completes the inventory of industrial minerals, building, and ornamental stones for the Sault Ste. Marie Mining Division. The inventory was started in June of 1984 to accomplish the following purposes: a) delineate target areas of suitable building or ornamental stones; b) examine deposits with industrial mineral applications; c) assess the economic potential of selected deposits; and d) promote the unique stones found in the area. It is hoped that the results of this inventory will encourage exploration for these commodities.

A total of 35 investigations were made in 1986: 22 for building stone; six for industrial minerals; and seven for ornamental stones. The following is a summary of the year's work with abbreviated descriptions for commodities which, in the author's opinion, may warrant further investigation. Figure 9.5 shows the location of these commodities.

BUILDING STONE

Olivine Gabbro - "Black Granite"

In Riggs Township (1.6 km southeast of Lochalsh) an area of approximately 0.5 km^2 is occupied by a well-exposed, olivine gabbro. This intrusion represents a middle to late Precambrian plug which "is composed of two genetically related facies of olivine gabbro: one forms the central core...the other forms the rim or margin" (Srivastava and Bennett 1978, p.30). The core is an olivine-rich gabbro composed of olivine, plagioclase, and pyroxene with accessory hornblende, biotite, serpentine, and magnetite. The rim is a pyroxene-rich olivine gabbro with essentially the same composition as the core, only in different proportions (Srivastava and Bennett 1978, p.30). Macroscopically, both facies look the same—a dark-grey to black, homogeneous, medium-grained rock which weathers a brown to orange brown. Joints are spaced from 10 cm to 1.5 m apart with a possible preferred orientation trending approximately southeast.

Several samples from both the rim and core were slabbed and polished. It was found that the samples from the core take a much higher glossy-black polish than those from the rim. It was noted, upon slabbing, that both facies contain an alignment of black minerals (probably pyroxene) which gives the stone a natural rift which could aid in quarrying.

Relief is in excess of 60 m and rail transportation is within 1 km of the deposit.

Granodiorite - "Blue-green Granite"

A granodiorite was examined in Naveau Township, approximately 1 km north of the High Falls dam. This granodiorite is a medium-to coarse-grained, blue-grey to greenish grey rock composed of quartz, plagioclase, and biotite. The quartz has a bluish opalescence and occurs in eyes and clots less than 3 mm in diameter. The plagioclase is greenish grey with grain sizes ranging from 2 mm up to 1 cm. The stone weathers grey to buff, and has joints spaced from 8 cm to 80 cm apart. Many rusty-weathering aplite dikes (Massey 1985, p.35), 1 to 4 mm wide, intrude the rock and detract from its overall appearance.

The granodiorite takes a fine polish, but the blue quartz eyes do not highlight the appearance of the stone as expected. Jointing is not favourable and, along with the aplite dikes, may render the deposit unsuitable for building stone purposes, although it may be suitable for ornamental uses.

Porphyritic Granite - "Red Granite"

A deposit of porphyritic granite occurs in the northern halves of Knicely and Killins Townships, approximately 28 km northwest of the Town of Wawa. This granite is an orange-red to red, medium-to coarse-grained rock composed of quartz, feldspars, biotite, and accessory epidote. The fleshy to red feldspars range from 2 mm to 3 cm in size. The epidote occurs in tiny veinlets from 1 mm to 3 mm in width and appears randomly throughout the rock. Jointing has no apparent preferred orientation, with spacing from a few millimetres to 1 m apart. Numerous diabase dikes (5 cm to over 2 m in width) intrude the granite locally.

This granite takes an excellent polish, with high reflection. Although the stone is highly fractured, its polishing characteristics and marketable red colour may make quarrying feasible. Other areas in the vicinity may be less fractured.

Monzonite - "Red Granite"

A large deposit (over 4 km^2) of hornblende monzonite to hornblende syenite occurs in Prince Township adjacent to the City of Sault Ste. Marie. The monzonite is a red, medium-grained, homogeneous rock composed of feldspar, hornblende, biotite, and accessory sericite. The feldspars are 3 mm to 5 mm and form 80 percent of the rock. Interstitial hornblende makes up 19 percent of the rock; biotite and sericite 1 percent . The stone weathers a whitish pink to red and no deleterious minerals or staining were observed. Joints are 20 cm to 2 m apart with an apparent random orientation.

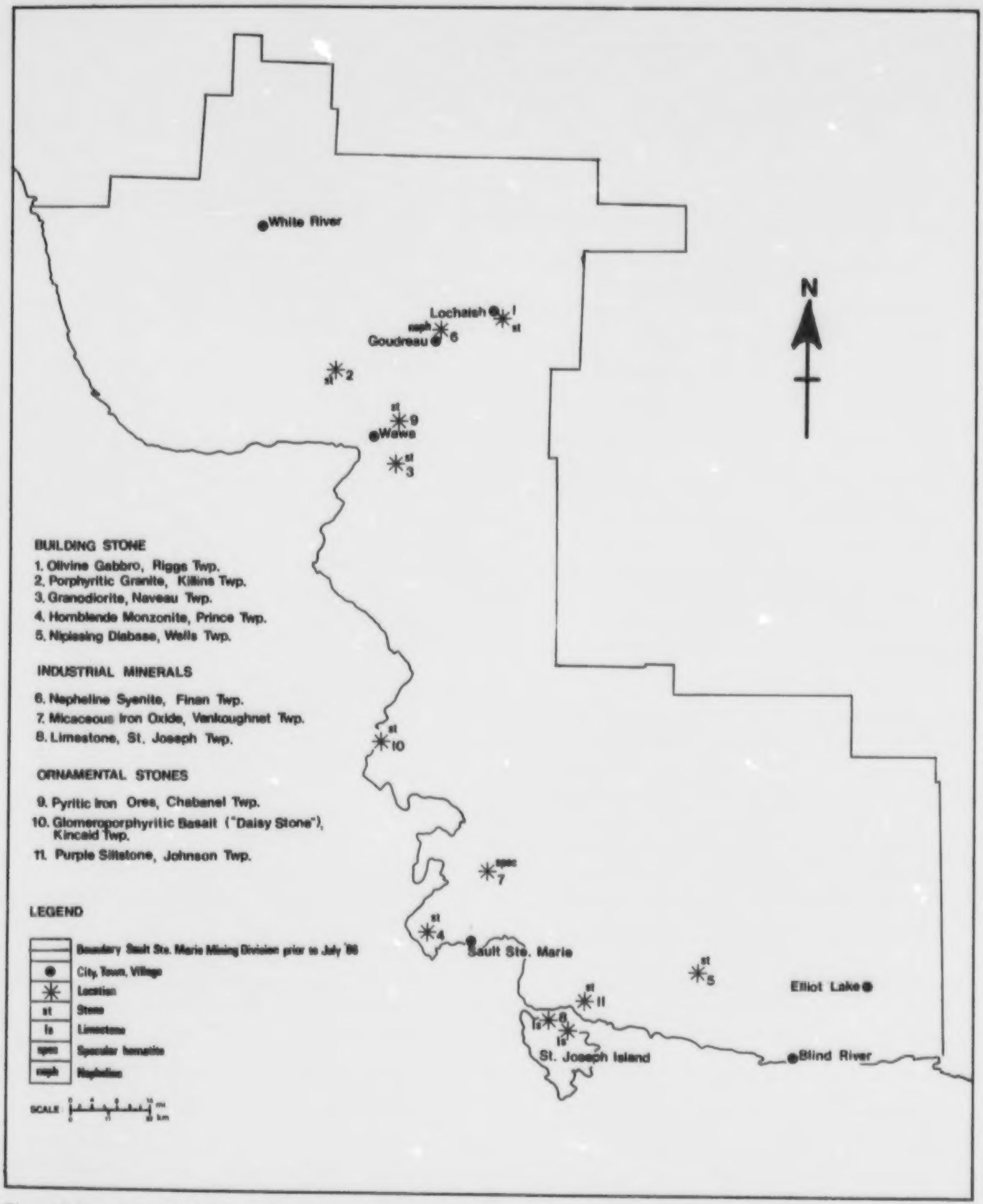
White River
Lochalsh
Goudreau
Wawa
Sault Ste. Marie
Elliot Lake
Blind River
St. Joseph Island
N
1
2
3
4
5
6
7
8
9
10
11
st
ls
spec
neph
BUILDING STONE
1. Olivine Gabbro, Riggs Twp.
2. Porphyritic Granite, Killins Twp.
3. Granodiorite, Naveau Twp.
4. Hornblende Monzonite, Prince Twp.
5. Nipissing Diabase, Wells Twp.
INDUSTRIAL MINERALS
6. Nepheline Syenite, Finan Twp.
7. Micaceous Iron Oxide, Vankoughnet Twp.
8. Limestone, St. Joseph Twp.
ORNAMENTAL STONES
9. Pyritic Iron Ores, Chabanel Twp.
10. Glomeroporphyritic Basalt ("Daisy Stone"), Kincaid Twp.
11. Purple Siltstone, Johnson Twp.
LEGEND
Boundary Sault Ste. Marie Mining Division prior to July '86
City, Town, Village
Location
st Stone
ls Limestone
spec Specular hematite
neph Nepheline
SCALE
mi
km

Figure 9.5. Industrial Mineral, Building and Ornamental Stones Project

TABLE 9.2

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AIREM - Airborne Electromagnetic Survey
AMAG - Airborne Magnetometer
DD - Diamond Drilling
EM - Electromagnetic Survey
EVAL - Evaluation
EXP - Exploration
GEOCHEM - Geochemical Survey
GEOL - Geology

GMAG - Ground Magnetometer
GRAD - Ground Radiometric
GRNDEM - Ground Electromagnetic
INDST RPT - Industrial Report
ORE EST - Ore Estimate
R+S - Rock and Soil
RPT - Report
RSVTY - Resistivity

AU - Gold

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	File Number
ABOTOSSAWAY	42C/02NE	INT. CORONA	AU	OMEP.	AIREM.,GMAG+&EM	1983	KEATING 0017
BIRD	42C/08SW	INT. CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
COOPER	42C/10NW	PEZAMERICA RES.	AU	ASSES.	GMAG +EM,GEOL SOIL GEOCHEM	1983	HAMBLETON 0020
CORBIERE	42C/02NE	ALGOMA CENTRAL CANAMAX RES. AMAX MNRLS.	AU	ASSES.	RPT,AMAG+EM,DD	1984	CORBIERE 0031
CORBIERE	42C/02NE	FALCONBRIDGE	AU	ASSES.	AMAG&EM,GEOL,DD ASSAYS	1983	CORBIERE 0032
DAVIEAUX	41N/01NE	CANEX AERIAL ALGOMA CENTRAL	AU	ASSES.	A+GMAG+EM,DD GEOL,SOIL,GEOCHEM	1966	VIBERT 0011
ESQUEGA	42C/02SE	FALCONBRIDGE	AU	ASSES.	AMAG+EM,GEOL,DD	1983	CORBIERE 0032
ESQUEGA	42C/02SE	J.Q.RESOURCES	AU	ASSES.	GEM+RAD,GEOL,DD, R+S GEOCHEM	1983	ESQUEGA 0031
FINAN	42C/08SW	ALGOMA STEEL CORP.	AU	ASSES.	GEOL,TRENCH,ASSAY	1981	FINAN 0038
FINAN	42C/08SW	CANAMAX RES.	AU	ASSES.	DD	1985	FINAN 0039 A1
FINAN	42C/08SW	MAGINO G.M.	AU	ASSES.	RPT,ASSAYS	1940	FINAN 0039 C1
GAPP	41O/04NW	NORANDA EX.	AU	ASSES.	DD	1986	GAPP 0022 A1
HAMBLETON	42C/14NE	PEZCORONA	AU	ASSES.	GEOL,SOIL GEOCHEM	1985	ODLUM 0016
HAMBLETON	42C/14NE	PEZAMERICA RES.	AU	ASSES.	GMAG+EM,GEOL,SOIL	1983	HAMBLETON 0020
JACOBSON	42C/08SW	CLINE DEV.	AU	ASSES.	AMAG&EM	1984	JACOBSON 0071
KEATING	42C/06SW	INT CORONA	AU	ASSES.	GEOL,R+S,DD, R+S GEOCHEM	1984	KEATING 0018
KILLINS	42C/03NE	INT CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
KILLINS	42C/03NE	INT CORONA	AU	ASSES.	GMAG+EM,GEOL,DD ROCK&SOIL GEOCHEM	1984	KEATING 0018
KNICELY	42C/06SE	INT CORONA	AU	ASSES.	AIREM,GMAG+EM,GEOL	1983	KEATING 0017
LALIBERT	42C/07SW	INT. CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM.	1983	KEATING 0017
LECLAIR	42C/07SW	INT. CORONA	AU	ASSES.	AIREM,GMAG+EN GEOL,GEOCHEM.	1983	KEATING 0017
LEESON	42B/05NW	NORTH GOLDFIELDS	AU	ASSES.	GMAG+EM,ASSAYS	1985	LEESON 0031
LEESON	42B/05NW	RENABIE G.MS.	AU	ASSES.	GMAG+EM,GEOL CLINOMETER,ASSAYS	1984	RENNIE 0038
LECLAIR	42C/)75W	INT. CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
LEGARDE	42C/03NW	INT. CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
LEGARDE	42C/03NW	INT. CORONA	AU	ASSES.	GMAG+EM,GEOL,DD R+S GEOCHEM	1984	KEATING 0018
LEVESQUE	42C/03NE	INT. CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
LEVESQUE	42C/03NE	INT. CORONA	AU	ASSES.	GMAG+EM,GEOL,DD R+S GEOCHEM	1984	KEATING 0018
MACASKILL	42C/02NW	INT. CORONA	AU	ASSES.	AIREM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
MEATH	42C/08NE	TENOGA CNSLTS.	AU	ASSES.	AMAG+EM,RSVTY	1985	STOVER 0027
MENZIES	42C/02NW	INT. CORONA	AU	ASSES.	AEM,GMAG+EM GEOL,GEOCHEM	1983	KEATING 0017
MCMURRAY	42C/02SW	MONTE CHRISTO RES. PANGO G.MS.	AU	ASSES.	GEM,GEOL,DD, ASSAYS	1984	MCMURRAY 0061
MCMURRAY	42C/02SW	PURSIDES, SURLUGA PRICE WATERHOUSE	AU	ASSES.	RPT,EVAL, ORE EST	1979	MCMURRAY 0062
MCMURRAY	42C/02SE	MACKEY PNT.	AU	ASSES.	RPT,DD,ASSAYS	1937	MCMURRAY 0063
MCMURRAY	42C/02SE	FRANCIS G.MS.	AU	ASSES.	RPT,TRENCH ASSAYS	1908	MCMURRAY 0064 A1
MUSQUASH	42C/02SE	INT. CORONA	AU	ASSES.	AEM,GMAG+EM GEOCHEM,GEOL	1983	KEATING 0017
NICOLET	41N/02SE	TRIBAG MNG.	AU	ASSES.	DD,ASSAYS	1964	NICOLET 0038
NICOLET	41N/02SE	TRIBAG MNG.	AU	ASSES.	DD,ASSAYS	1963	NICOLET 0039

TABLE 9.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	File Number
NICOLET	41N/02SE	TRIBAG MNG.	AU	ASSES.	DD,ASSAYS	1967	NICOLET 0040
ODLUM	42C/15SW	PEZAMERICA	AU	ASSES.	GMAG+EM,GEOL SOIL GEOCHEM	1983	HAMBLETON 0020
ODLUM	42C/15SW	PEZCORONA	AU	ASSES.	GEOL.SOIL GEOCHEM	1985	ODLUM 0016
RABAZO	41N/15NW	GOLDEN POND	AU	ASSES.	DD	1984	RABAZO 0040 A1
RENNIE	42B/05NW	TENOGA CNSLT.	AU	ASSES.	AMAG+EM,RSVTY	1985	STOVER 0027
RENNIE	42B/05NW	WESTFIELD MNS.	AU	ASSES.	GRNDEM,IP,GEOL GEOCHEM	1984	RENNIE 0037
RENNIE	42B/05NW	RENABIE G.MS.	AU	ASSES.	GMAG+EM,ASSAYS CLINOMETER,GEOL	1984	RENNIE 0038
RENNIE	42B/05NW	WESTFIELD MNS.	AU	ASSES.	DD,ASSAYS	1984	RENNIE 0039 A1
RENNIE	42B/05NW	WESTFIELD MNS.	AU	ASSES.	DD	1984	RENNIE 0040 A1
RENNIE	42B/05NW	WESTFIELD MNS.	AU	ASSES.	EXPEND	1985	RENNIE 0040 B1
RIGGS	42C/08SW	OASIS RES.	AU	ASSES.	GMAG+EM	1985	RIGGS 0022
RIGGS	42C/08SW	MCGINN,J. MANDERSON,W.	AU	ASSES.	GEOL.ROCK GEOCHEM	1983	RIGGS 0023
RUNNALLS	41N/08SE	ALGOMA CENTRAL RWY. VENN, V.R.	AU	ASSES.	GMAG,GEOL.	1962	RUNNALLS 0019-A1
RUNNALLS	41N/08SE	CANEX AERIAL EX.	AU	ASSES.	GMAG+EM,GEOL.	1967	RUNNALLS 0020 A1
STOVER	42B/05SW	RENABIE G.MS.	AU	ASSES.	GMAG+EM ASSAYS	1984	RENNIE 0038
STOVER	42B/05SW	TENOGA CONS.	AU	ASSES.	AMAG+EM,RSVTY	1985	STOVER 0027
STRICKLAND	42C/15SW	PEZCORONA	AU	ASSES.	GEOL.SOIL GEOCHEM	1985	ODLUM 0016
TEDDER	42C/11NE	PEZCORONA	AU	ASSES.	GEOL,SOIL	1985	ODLUM 0016
VIBERT	41N/01NE	CANEX AERIAL ALGOMA CENTRAL RW	AU	ASSES.	AIR+GMAG+EM GEOL,DD,SOIL-GEOCHEM	1966	VIBERT 0011
VIBERT	41N/01NE	NORANDA EX.	AU	ASSES.	GMAG+EM	1983	VIBERT 0012 A1
WEST	42C/08SE	TENOGA CNSLTS.	AU	ASSES.	AMAG+EM,RSVTY GEOCHEM	1985	STOVER 0027
ABBEY LAKE	42C/03NW	PROUX,P	AU	ASSES.	DH,ASSAYS	1983	42C/03NW 0015
ABBEY LAKE	42C/03NW	MORISETTE, M.	AU	ASSES.	DH,ASSAYS	1983	42C/03NW 0014 A1
PUKASKWA RIVER	42C/04NE	CAPTAIN CONS. TEELAKE RES.	AU	ASSES.	GEOL,R+SOIL GEOCHEM	1983	42C/04NE 0017 A1
DENIS LAKE	42C/11NW	DANRA RES.	AU	ASSES.	AMAG+EM,GEOL	1984	42C/11NW 0013 A1
WHITE LAKE SOUTH	42C/12NE	LAC MINERALS	AU	ASSES.	GEOL	1985	42C/12NE 0047 A1
WHITE LAKE SOUTH	42C/12NE	WINDARRA MIN.	AU	ASSES.	GEOL.	1982	42C/12NE 0049 A1
WHITE LAKE SOUTH	42C/12NE	LAC MINERALS	AU	ASSES.	GEOL.	1985	42C/12NE 0049 C1
WHITE LAKE SOUTH	42C/12NE	LAC MINERALS	AU	ASSES.	GEOL	1985	42C/12NE 0050
WHITE LAKE SOUTH	42C/12NE	NORANDA EX.	AU	ASSES.	GEOL	1985	42C/12NE 0051
WHITE LAKE SOUTH	42C/12NE	ANGELA DEV.	AU	ASSES.	GEOL,EXP,R+S GEOCHEM	1985	42C/12NE 0052
MOLSON LAKE	42C/12NW	LAC MINERALS	AU	ASSES.	SOIL,GEOCHEM	1984	42C/12NE 0048
MOLSON LAKE	42C/12NW	LONG LAC MIN.	AU	ASSES.	GEOL	1985	42C/12NE 0053
MOLSON LAKE	42C/12NW	LAC MINERALS	AU	ASSES.	GEOL.	1984	42C/12NW 0066
MOLSON LAKE	42C/12NW	CALPETRO RES PROLIFIC PETRO. CAPOOSE MNRLS.	AU	ASSES.	INDUST RPT.GEOL	1983	42C/12NW 0067 A1
TARBON LAKE	42C/12SE	EBONY G.MS.	AU	ASSES.	GEOL	1985	42C/12SE 0013 A1
HERRICK LAKE	42C/12SW	MARCH RES.	AU	ASSES.	GMAG+EM,GEOL, SOIL,GEOCHEM	1983	42C/12SW 0019
WHITE LAKE NORTH	42C/13SE	UNITED WESTLAND	AU	ASSES	GEOL,SOIL GEOCHEM	1985	42C/13SE 0025
SHABOTIK RIVER	42C/14NW	GOLDEN RULE	AU	ASSES.	INDST.RPT.GEOL	1983	42C/14NW 0013 A1
BIG ROCK LAKE	42F/03SW	GOLDEN RULE	AU	ASSES	INDUST RPT.GEOL	1983	42C/14NW 0013A1

TABLE 9.3: MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS ARE PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Ontario Geological Survey Reports
243 - Batchewana-Pangis Area

Open File Reports
OFR 5595
OFR 5576

Preliminary Maps-Geological Series
P.2842
P.2959
P.2968
P.2969
P.2970
P.2971
P.2972
P.2988

Coloured Maps
2479
2480

O.G.S. Geochemical Series Maps
80757
80758
80797

Geological Data Inventory Folios

GDIF#	Township
289	Glasgow
290	Dumas
291	Dunphy
294	Bruyere
295	Copenace
296	Musquash
297	Corbiere
298	Dolson
299	Echum
300	Loach
301	Raaflaub
302	Running
303	Gaudry
305	Lunkie
306	Tupper
307	Daumont
308	Hughes

Geological Survey of Canada
Open File Reports
Paper 86-1A

The stone polishes to a high gloss with good reflection and would be suitable as both building and monument stone.

Average relief of the area is over 12 m and outcrops are large and continuous which would make further evaluation relatively easy.

Nipissing Diabase - "Black Granite"

A deposit of Nipissing Diabase was examined in Wells Township approximately 80 km east of the city of Sault Ste. Marie. The diabase has the characteristic ophitic texture and is composed of plagioclase, pyroxene, and amphibole. The colour of the diabase is an appealing mottled black-green-pink. No iron staining was observed. The stone weathers to a light grey-brown. Joints are spaced from 40 cm to 1.5 m apart, with no preferred orientation apparent. Granophyric phases were observed locally. The stone takes on an excellent polish and would be suitable for monument stone or building stone.

In addition to the above deposits, further work was done on the Jacobsville sandstone. A survey was done of the buildings in the area which have used the sandstone in their construction. A series of photographs were taken of the more impressive structures and placed in an album which may be viewed at the Resident Geologist's Office in Sault Ste. Marie.

Additional work was done in the following areas: a) West Township–to evaluate the potential of the granodiorites; b) VanKoughnet Township–to evaluate the potential of a quartz diabase; c) Thompson Township–to evaluate the potential of the red and pink granites; and d) miscellaneous areas which did not show good potential.

INDUSTRIAL MINERALS

Nepheline Syenite

Samples were collected for whole-rock analyses from a nepheline syenite complex in Finan Township, approximately 30 km northeast of the Town of Wawa. The nepheline syenite is a coarse-grained, grey rock composed of feldspars, nepheline, biotite, and magnetite. Magnetite occurs in clots up to 3 cm in size. The rock weathers a white to grey white and is deeply pitted where the nepheline has been weathered out. Analyses reported by Gledhill (1927 p.59) show alumina contents from 18.84 percent to 20.76 percent. Sage (1984, p.59) made the statement: "The complex consists of a coarse-grained nepheline syenite rim and a coarse-grained cancrinite syenite core. The cancrinite is likely an alteration of nepheline and the 2 varieties of syenite likely comprise the same phase". Rail transportation is within 1 km of the deposit.

Micaceous Iron Oxide

A small deposit of micaceous iron oxide was examined in VanKoughnet Township, approximately 20 km north of the City of Sault Ste. Marie. The micaceous iron oxide occurs as a small vein in Huronian quartzite. The vein is from 1 to 12 cm wide with a traceable length of approximately 4 m before it is obscured by drift. Though the deposit is small it appears to be of high quality as it can be broken down in a mortar and pestle into fine flakes without producing any red ochre. Very little work has been done in the past on this deposit and it may warrant further examination to determine its extent.

Samples of Ordovician limestone from several locations on St. Joseph Island were sent for analyses to test its suitability for use as agricultural lime. Local companies were surveyed to determine what industrial minerals they use and to ascertain if any of

TABLE 9.4 CORE STORED AT SAULT STE. MARIE DRILLCORE LIBRARY

AREA /TOWNSHIP	COMPANY	DRILL HOLE(S) TOTAL LENGTH (m)	CORE STORED (m)
41N/14NW	FALCONBRIDGE NICKEL	2204.2	1191.2
42C/03NW	NORANDA EXPLORATION	111.2	7.8
42C/03NW	TUNDRA RESOURCES	603.9	363.3
42C/03SW	AMOCO CAN. PET. LTD.	377.2	339.3
ABERDEEN	AMAX EXPL	616.5	218.1
ABOTOSSAWAY	ADONIS MINES LTD	698.5	110.0
ABOTOSSAWAY	EGO MINES LTD.	5601.8	663.6
ABOTOSSAWAY	GOLDEN SPOKE MINES	1137.6	518.1
ABOTOSSAWAY	SUPERIOR ACID & IRON	796.9	558.4
ABOTOSSAWAY	UMEX-UNITED CANSO	753.0	533.6
AGUONIE	NORANDA EXPLORATION	188.7	181.8
ALBANEL	BRUCE PRESTO MINES	200.0	4.5
ALBANEL	FORT NORMAN EX INC	191.6	10.6
ALBANEL	HECLA-HANNA MINING	909.7	849.3
ASSELIN	EMPIRE EXPL. LTD.	2573.4	1994.4
ASSIGINACK	ONT.GEOL. SURVEY	136.2	136.2
BEANGE	KERR-MCGEE CORP	8138.1	2117.8
BEANGE	MID-NORTH ENG	466.0	6.6
BEANGE	ST DENIS,A.	507.1	4.5
BEANGE	WESTERN NUCLEAR M L	1301.5	1.8
BIDWELL	ONT.GEOL. SURVEY	165.9	79.9
BIRD	NORANDA EXPLORATION	161.7	146.3
BOLGER	FORT NORMAN EX INC	341.2	6.6
BOLGER	WESTERN NUCLEAR M L	759.3	3.9
BOLGER	ZENMAC MS/KERR-MCGEE	1863.6	75.7
BOUCK	KERR-MCGEE CORP	7540.9	4357.5
BRYANT	SCORE RESOURCES	371.2	346.3
BUCKLES	KERR-MCGEE CORP	1181.8	1054.5
BUCKLES	NORTH AMERICAN NUCL	279.0	4.2
BURPEE	ONT.GEOL. SURVEY	284.7	249.1
CASSON	AGGRESSIVE MINING	212.4	0.0
CHESLEY	CHESLEY ENTERPRISES	30.9	30.9
COBDEN	UNITED NUCLEAR MINES	765.4	28.7
COCKBURN IS.	ONT. GEOL. SURVEY	517.8	517.8
CORBIERE	CANAMAX	267.9	267.9
CORBIERE	FALCONBRIDGE NICKEL	312.8	294.2
COWIE	AMAX MINERALS EXPL.	1156.6	1076.3
DAHL	CAPTAIN CONS.RES. L.	306.9	201.5
DAMBROSSIO	PROSPECTING GEOPHYS.	275.7	275.7
DAUMONT	HIGHLAND-CROW LTD	1062.1	1062.1
DAWSON	ONT.GEOL. SURVEY	99.3	99.3
DEBASSIGE	GOLDEN VALE EXPL.	351.2	343.6
DEROCHE	FELDSTEIN,H	60.6	0.9
DEROCHE	MISSISSAUGI MNG.INC.	77.8	77.8
DRUMMOND IS.	ROGERS,D.P.	376.3	40.0
DUNCAN	LONG BOW EX INC	118.7	118.7

TABLE 9.4 Continued

AREA /TOWNSHIP	COMPANY	DRILL HOLE(S) TOTAL LENGTH (m)	CORE STORED (m)
DUNCAN	WEYERHAUSER	1991.8	23.6
ESQUEGA	FIRESPUR EXPLCRATION	153.6	153.6
ESQUEGA	J.Q.RESOURCES	472.7	466.6
ESQUEGA	NEW KELORE MINES LTD	1083.4	174.2
FENWICK	TEXAS GULF SULFUR	412.1	9.6
GAIASHK	COMINCO EX L	1926.9	26.6
GAIASHK	KERR-MCGEE CORP	2806.3	225.7
GALBRAITH	IMPERIAL OIL ENTER	748.1	37.8
GAUDETTE	CONS. NEW PACIFIC	109.8	94.6
GAUDETTE	HIGHLAND-CROW LTD	411.2	408.4
GORDON	ONT.GEOL. SURVEY	44.6	44.6
GOULD	IMPERIAL OIL ENTER	797.5	17.2
GRASETT	PACIFIC PETROLEUM	973.0	18.1
GROSEILLIERS	FALCONBRIDGE NICKEL	436.6	368.4
GUNTERMAN	DENISON MINES	1198.4	9.6
GUNTERMAN	KERR-MCGEE CORP	1492.4	77.8
GUNTERMAN	NORTH AMERICAN NUCL	1560.9	1339.3
GUNTERMAN	RIO TINTO CDN EX LTD	1521.2	1281.5
GUNTERMAN	SILVERMAQUE MS L	2950.6	787.8
GUNTERMAN	STANROCK URANIUM M	1180.3	68.1
HAUGHTON	IMPERIAL OIL ENTER	1830.3	36.3
HAUGHTON	KERR ADDISON MINES L	86.6	39.6
HEMBRUFF	SUTHERLAND & ASSOC	2144.2	530.3
HERRICK	TEXAS GULF SULFUR	587.8	14.2
HOWLAND	ONT.GEOL. SURVEY	56.6	56.6
HUGHES	ASARCO EXPL. CO.	182.1	174.8
HUGHES	CAMPBELL,C.W.	371.5	371.5
I.R.#26	ONT.GEOL. SURVEY	60.9	60.9
JACOBSON	NORANDA EXPLORATION	111.5	108.4
JACOBSON	POTVIN J.C.	658.3	654.3
JARVIS	LONG BOW EX INC	787.4	787.4
JARVIS	WATSON LAKE MINES	1482.7	1482.7
JOCELYN	D.P.ROGERS/LACANA M	762.6	564.6
JOGUES	COMINCO EX L	2494.2	27.2
JOGUES	FORT NORMAN EX INC	1898.7	198.4
JOGUES	GULF MINERALS	1430.3	34.2
JOGUES	MORGAN HYDROCARBONS	1025.4	13.6
JOGUES	RAYLLOYD MS & EX	1497.5	13.6
JOHNSON	NISI CREEK M L	340.9	204.5
JOHNSON	TRIANGLE EX. L	217.8	195.4
JOUBIN	DENISON MINES	423.0	5.4
JOUBIN	KERR-MCGEE CORP	5906.6	779.0
JOUBIN	LONG LAC EX	3486.3	903.0
JUILLETTE	FALCONBRIDGE NICKEL	1508.4	22.7
KAMICHISITIT	COMINCO EX L	4567.8	60.6
KAMICHISITIT	FALCONBRIDGE NICKEL	1791.2	42.4

TABLE 9.4 Continued

AREA /TOWNSHIP	COMPANY	DRILL HOLE(S) TOTAL LENGTH (m)	CORE STORED (m)
KAMICHISITIT	IMPERIAL OIL LTD.	2712.1	318.1
KAMICHISITIT	RAM PETROLEUMS LTD.	1745.1	7.5
KAMICHISITIT	SHELL CANADA	1199.0	15.1
KAMICHISITIT	SUBEO LTD	1800.3	37.8
KAMICHISITIT	SUPERIOR NORTHWEST L	1356.3	15.1
KEATING	INT'L CORONA RES.LTD	820.8	820.8
KEATING ADD'L	NORANDA EXPLORATION	376.9	332.7
KEHOE	GULF MINERALS	347.5	13.6
KILLINS	INT'L CORONA RES.LTD	80.5	80.5
KINCAID	KEEVIL MINING GROUP	235.7	3.3
KINCAID	MCKINNEY GOLD MS LTD	518.7	473.0
KINCAID	TRIBAG MINING CO. L	141.2	2.4
KINCAID	WHITMELL,W	71.3	0.8
LECLAIRE	NORANDA EXPLORATION	60.6	37.9
LEESON	CONIAGAS MINES LTD.	2252.7	1196.3
LEFROY	CONWEST EX CO LTD	787.8	121.2
LEGARDE	INT'L CORONA RES.LTD	283.3	283.3
LEHMAN	KERR-MCGEE CORP	1356.0	1098.4
MANITOU RIVER	ONT.GEOL. SURVEY	30.6	30.6
MCCRON	SCORE RESOURCES	101.3	93.6
MCGIVERIN	FORT NORMAN EX INC	508.4	15.4
MCMURRAY	MONTE CRISTO RES LTD	476.9	476.9
MCMURRAY	PANGO GOLD MINES LTD	1280.6	958.1
MCMURRAY	SUTHERLAND & ASSOC	387.5	227.8
MEATH	NORANDA EXPLORATION	390.0	327.5
MICHIPICOTEN I	ADVANCE RED LAKE G M	2053.6	13.3
MICHIPICOTEN I	NEARCTIC RESOURCES	619.0	531.2
MILLS	ONT.GEOL. SURVEY	121.8	121.8
MONTGOMERY	COMINCO EX L	1509.0	20.9
MORIN	SUTHERLAND & ASSOC	683.0	7.5
NAVEAU	GREAT LAKES POWER CO	40.3	40.3
NICHOLAS	HECLA-HANNA MINING	2462.4	56.5
NICHOLAS	MORRISON NUCLEAR	1313.0	20.6
NICOLET	DEKALB MINING CORP	303.0	163.0
NICOLET	NEW SENATOR-ROUYN L	2391.5	310.6
NICOLET	TRIBAG MINING CO.	8959.8	265.1
NICOLET	TRIBAG MINING CO. L	294.2	137.2
NORBERG	DEKALB MINING CORP	43.6	6.0
NORBERG	NEW SENATOR-ROUYN L	365.7	280.3
NORBERG	TRIBAG MINING CO. L	169.6	7.5
NORTH CHANNEL	CONWEST EX CO LTD	2287.8	472.1
NORTH CHANNEL	TEXAS GULF SULFUR	5687.8	201.5
NORTH CHANNEL	UNITED NUCLEAR MINES	2627.2	106.9
NOUVEL	PACIFIC PETROLEUM	1316.6	46.9
NOUVEL	RIDGEFIELD URANIUM M	525.7	9.0
OLSEN	TECK EX L	59.6	3.0

TABLE 9.4 Continued

AREA /TOWNSHIP	COMPANY	DRILL HOLE(S) TOTAL LENGTH (m)	CORE STORED (m)
PALMER	CONS. MARBENOR MS.L.	237.5	68.1
PALMER	GETTY MINES LTD.	1338.9	1338.9
PALMER	KEEVIL MINING GROUP	365.7	275.1
PALMER	PALL MALL MINES	532.4	133.4
PALMER	PHELPS DODGE CORP	210.0	182.7
PARKINSON	AMAX EX INC	1218.7	24.2
PARKINSON	COMINCO EX L	1164.8	15.1
PARKINSON	KERR-MCGEE CORP	366.3	151.5
PATTON	COMINCO EX L	4154.2	59.3
PROCTOR	KERR-MCGEE CORP	183.3	3.0
RABAZO	CHRISTIANSEN & SUTH	50.0	50.0
RABAZO	GOLDEN POND RES.LTD	620.0	617.8
RABAZO	ROLLER RESOURCES INC	365.7	350.3
RABAZO	SUTHERLAND & ASSOC	152.8	53.0
RAIMBAULT	CANAMAX EXPLORATION	157.0	157.0
RAIMBAULT	CDN JOHNS-MANVILLE	1182.8	803.0
RENNIE	NORANDA EXPLORATION	116.6	116.6
RENNIE	RENABIE MINES LTD.	846.9	10.3
ROBINSON	ONT.GEOL. SURVEY	224.0	224.0
ROSE	PAYNTER,R.	163.6	92.4
RUNNALS	GRANGES EXPL. L.	1277.5	1277.5
RYAN	ALGOMA CENTRAL RLWAY	609.2	602.7
RYAN	JOGRAN MINES LTD	3356.9	3280.6
RYAN	PALL MALL MINES	266.6	147.2
RYAN	PHELPS DODGE CORP	1603.3	233.9
RYAN	SINCLAIR,D	61.2	0.5
SAGARD	ATLANTIC RICHFIELD P	373.0	6.6
SAGARD	CANAMAX EXPLORATION	939.2	939.2
SANDFIELD	ONT.GEOL. SURVEY	42.6	42.6
SCARFE	COMINCO EX L	4087.5	67.2
SLATER	MONCRIEF URAN MINES	1022.1	195.4
SLATER	STREAMSIDE MINES	337.5	191.5
ST. GERMAIN	AMOCO CAN. PET. LTD.	118.7	118.7
STOVER	CARBREW EXPL. LTD.	361.5	318.1
STOVER	MISSI BAY RES. LTD.	872.1	16.0
STOVER	NORANDA EXPLORATION	26.6	26.6
TARENTORUS	GREAT LAKES POWER CO	446.2	387.3
TEHKUMMAH	ONT.GEOL. SURVEY	75.5	75.5
THESSALON	CONWEST EX CO LTD	2073.9	60.0
TIMMERMANS	FORT NORMAN EX INC	1325.4	190.0
VANKOUGHNET	AIRNORTH MINES	4071.2	2497.5
VANKOUGHNET	FELDSTEIN,H	91.2	1.2
VARLEY	FALCONBRIDGE NICKEL	703.3	3.6
WEST GRANT IS	CONWEST EX CO LTD	752.7	62.1
** TOTAL **		196145.8	58864.1

these materials could be provided locally. A tour was also taken of the Reiss Lime Company plant in Spragge, approximately 120 km east of Sault Ste. Marie.

Samples of slag from the Algoma Steel Corporation Limited were ground down to determine its suitability as a substitute for silica sand used in sandblasting.

ORNAMENTAL STONES

Several stones were evaluated for their ornamental qualities:

1. Samples of a pyrite ore were taken from the old Lucy Pit in Wawa to be slabbed and polished. The ore polishes well and makes attractive bookends and pen sets. From the same area, samples of a recrystallized, brecciated chert also polished well and would be suitable as ornamental stone.
2. A glomeroporphyritic basalt (daisy stone) was examined approximately 128 km north of Sault Ste. Marie. Plagioclase laths up to 4 cm across form radiating textures (which resemble daisies) in a fine-grained matrix. This flow can be traced along strike for approximately 16 km (Giblin 1974, p.61). The stone is badly fractured and soft and does not polish well, but its unique "daisylike" arrangements of plagioclase laths is appealing.
3. A purple siltstone member of the Lorrain Formation has been delineated near Desbarats (40 km east of Sault Ste. Marie). It may be an excellent source of crushed landscaping aggregate due to the outstanding dark-purple colour.
4. Various-coloured quartzites of the Lorrain Formation were crushed and sized and its use as landscaping materialwill be encouraged. Common colours are red, black, green, peach, and white.

Open File Reports will be published at a later date and will contain more detailed descriptions of all deposits examined, including assay and sieve analyses data.

Time was also spent in locating and loading one- to four-ton boulders, representative of the Sault Ste. Marie Mining Division, for a rock display at the University of Waterloo. Local prospectors have begun to show an interest in building stone, and time was spent slabbing and polishing samples for them and responding to inquiries. A display of all stones and minerals evaluated during the inventory was shown at the Ontario Geological Survey's Open House in Toronto in December of 1986. All samples may be viewed at the Resident Geologist's Office in Sault Ste. Marie, Ontario.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

John Fortesque (Geochemist), of the Geophysics/Geochemistry Section, Ontario Geological Survey, continued the Northern Lakes Interdisciplinary Studies in the Montreal River area, District of Algoma. About 150 water samples and 35 cores of lake sediments were collected in August, 1986. The object of the study is to conduct a mineral resource appraisal of an area 75 km (north-south) by 10 km (east-west), extending south from Loach Township in the Montreal River area.

T.L Muir (Geologist), of the Precambrian Geology Section, continued a multiyear project to provide a detailed geological map and report on the Hemlo Deposit area. Stratigraphic and structural features of the Hemlo gold deposits are to be highlighted. The total area to be mapped is 59 km^2 including the northern parts of Bomby and Lecoeur Townships.

R.P. Bowen (Geologist) completed the second year of a three-year project to provide a geological map and a report on the geology and mineral deposits of the Mishibishu Lake area. The project is being undertaken by the Precambrian Geology Section of the Ontario Geological Survey. The area mapped in 1986 was about 1216 km^2, and is bounded by 85°00'W and 86°00'W longitudes and 47°52'30"N and 48°10'00"N latitudes. The survey was helicopter supported. Traverses were spaced at 1/4-mile intervals on supracrustal rocks and at a reconnaissance scale on the surrounding granitic terrain.

K.B. Heather (Geologist) of the Mineral Deposits Section, Ontario Geological Survey, was attached to the field party of R.P Bowen for the purpose of providing detailed maps and reports of the mineral deposits in the map area. Of special interest are the gold occurrences currently being explored in the area.

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10. Sudbury Resident Geologist's Area, Northeastern Region

W. Meyer[1], R.W. Campbell[2], and F.H. Toews[3]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

[3]Contract Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

INTRODUCTION

The Sudbury Resident Geologist's area encompasses about 28 000 km^2 (Figure 10.1). Geologically it can be divided as follows:

Paleozoic: Ordovician and Silurian marine sediments on Manitoulin and several small islands. These underlie about 18 percent of the area.

Proterozoic: Grenville Province. About 33 percent of the area belongs to the Grenville Front Tectonic Zone and Central Gneiss Belt. 160 km of the Grenville Front lies within the area.

Proterozoic: The Sudbury Igneous Complex and Whitewater Group sedimentary rocks cover about 4 percent of the area.

Proterozoic: Southern Province clastic sedimentary rocks, volcanic rocks, and diabases of the Huronian Supergroup underlie about 21 percent of the area.

Archean: Granites, gneisses, and greenstones (volcanic-sedimentary belts) of the Superior Province underlie about 24 percent of the area. The granite to greenstone ratio is about 19:1.

Glacial till and organic overburden cover much of the bedrock.

The northern and southeastern boundaries of the Sudbury Resident Geologist's area, as shown on Figure 10.1, will change in 1987. The others will remain the same.

The area is well known for its large nickel-copper-precious metal mines, many gold and base metal prospects, and enigmatic geological features. These draw many companies, prospectors, and visitors to the area each year.

STAFF

P.E. Giblin moved to the position of Manager, Mineral Resources, Northeastern Region.

R. Adlington worked on contract from January to June and again in November and December, working mostly on Geological Data Inventory Folios (GDIFs).

R.W. Campbell was Resource Geologist for all of 1986.

M. Croteau assisted Resource and Resident Geologists with field work from May to September.

L. Jerome worked on contract from June to December, working mostly on GDIFs.

T. Livingstone now fills the secretary position on a full-time basis.

W. Meyer was Resident Geologist for all of 1986.

F. Toews continued his investigation of gold mineralization between Sudbury and the Espanola area.

M.E. Grant and M. Napoli, senior assistants, helped with field and office work and one junior assistant, D. Pilkey, helped with field work. They also had a volunteer, Fanie Gotlop, who assisted with field work.

STAFF ACTIVITIES

SUMMARY

Staff of the Resident Geologist's office visited mineral properties, areas of problematic geology, collected drill core, guided visitors on tours across the Sudbury structure and vicinity, assisted prospectors and mining company personnel with office researches, mineral identification, and field problems, talked to Junior Rangers at the Ministry of Natural Resources Fort La Cloche camp and tourists at Killarney Provincial Park, attended gold and remote sensing seminars, participated in Sudbury's 4th Annual Gem and Mineral Show, and worked on special projects more fully described below.

By the end of November, 393 persons had visited the office and had been assisted with various problems.

SODA METASOMATISM by W. Meyer

Work continued last year on soda metasomatism and associated gold mineralization, but progress was slow. Emphasis was placed on getting a better understanding of geometric and temporal relationships between altered rock and host rock.

In last year's annual report (Meyer *et al.* 1986), the author described the general features of soda metasomatism and associated gold mineralization east of Lake Wanapitei. Soda metasomatism is far more widely spread, and its manner of occurrence more varied than previously thought.

Soda metasomatism occurs from near Sault Ste. Marie (G. Bennett, Resident Geologist, Ministry of Northern Development and Mines, Sault Ste. Marie; S. Lumbers, Royal Ontario Museum, Toronto; personal communication, 1986) to perhaps as far east as Cobalt (D.G. Innes, Vice President, Exploration, Emerald Lake Resources Incorporated, personal communication, 1986), a distance of almost 400 km. All occurrences known to the author are in Huronian rocks, but according to S. Lumbers (personal communication, 1986) it also occurs in granites. One suspected occurrence in Archean greenstones in Parkin Township needs to be confirmed chemically.

Replacement may be from incipient to nearly 100 percent. Analyses with close to 11 percent Na_2O are common. This is high when considering that ideal albite can have no more than 11.83 percent Na_2O (W. Meyer, unpublished information).

Soda metasomatism affects Nipissing Diabase, and matrix of breccias thought to have been formed by the Sudbury event. Olivine diabase dikes cut soda enriched rocks, and are chilled against these in two places in Scadding Township. One new site was found last year that may shed more light on the age. North of Skead, in Maclennan Township, a vein of metasomatic albite cuts a vein of pseudotachylite, thought to be related to the Sudbury event.

This dates soda metasomatism between 1.85 and 1.2 billion years, the ages now accepted for the Sudbury event and olivine diabase intrusion. The danger here is the tacit assumption that soda metasomatism was one shortlived event, and that the breccias affected by it were caused by one shortlived Sudbury event. Both assumptions are tenuous.

Metasomatic soda-rich rocks are mostly pink, or occasionally tan coloured. They are easily recognized in contrasting host rocks such as wacke, siltstones, paraconglomerates, limestones, and diabase. They are difficult to recognize in rocks of similar colour, such as feldspathic quartzites and arkoses.

Their size ranges from short, narrow veins snaking through the host rock, to dikelike features tens of metres wide and hundreds of metres long, to irregular bodies hundreds of metres across. In Scadding Township, metasomatically altered rock can be followed along one stratigraphic horizon in the Huronian Supergroup for about 6 km.

Soda-rich rocks may be massive or strongly brecciated. Breccias are of several types. One is *in situ* brecciation of metasomatically altered rock, another is metasomatically altered breccia, and a third is where fragments of soda-rich rock occur in a breccia of predominantly other rock types. In Parkin Township large fragments of Serpent Formation quartzite are surrounded by a matrix rich in small fragments of pink metasomatic albite. Here the albite fragments appear to have streamed up from below.

Soda metasomatism always appears to have been the first event, followed by others. East of Lake Wanapitei, well shaped carbonate rhombohedra replace albite, and the carbonate rhombs may in turn be replaced by quartz or chlorite. Where brecciated or sheared, secondary chemical events may include quartz flooding, introduction of carbonate, chloritization, sulphide introduction, and copper-gold minerals.

One idea developed during the year is as follows. Soda-rich solutions rose from depth along faults or pre-existing breccias. At an unknown depth below surface they replaced wall rock, and perhaps also spread laterally along certain stratigraphic horizons. This process choked the conduits. Pressure continued to build up from below, and explosively brecciated the newly formed plugs of metasomatic rock and overlying rock. This can explain the breccia variations observed.

Soda metasomatism is a major chemical event of regional proportion, which has to be fitted into the geological history of the Southern Province. The view that large scale events predate and postdate the Sudbury event, and that the Sudbury event is not something fortuitous in space and time, is gaining more support. So far the widespread soda metasomatism can not be linked to anything obvious. Like the Sudbury event, it may be of deep crustal or even upper mantle origin.

BUILDING STONE POTENTIAL OF THE SUDBURY AREA by R.W. Campbell

Natural stone has increased in popularity over the past few years. With the increasing costs of building material and the advancement of quarrying techniques, stone has become an esthetic alternative to concrete and steel. A lot of work has to be done on a prospect to determine its quarryability and value. This makes the discovery of a good stone quarry rare and expensive.

The Sudbury area has had a history of stone production. In 1906 W.J. Bell, a prominent lumber executive, built a mansion on the shore of Lake Ramsey out of locally quarried McKim Formation mudstone. At least one other building is known to have been built with McKim Formation mudstone but has since been demolished. Vos *et al.* (1981) describe several other stone quarries that were operated around the Sudbury area.

In 1980, Ellero and Son established a monument and stone sculpting company in Sudbury. Ellero and Son use local nickel ore and Espanola Formation limestone for carving, as well as imported stone. Their customers are becoming more particular about purchasing Canadian-made products of Canadian stone. Ellero and Son also manufacture stone furniture, such as coffee tables, dining room tables, lamps, and end tables.

During this past summer, over 30 sites south of Sudbury were investigated for potential stone quarries. The areas with the highest potential for quarryability, not neccessarily marketability, are the St. Charles Sill, Cosby Batholith, Rutter Pluton, Servos Pluton, and the Killarney Batholith. Next summer, follow-up work is planned on the sites of highest potential. The area north of Sudbury will also be investigated.

Within the Killarney Batholith, Canadian Unique Granites Limited has investigated a pink feldspar porphyry with a black matrix. Over the past year they have drilled and tested the site, and removed two large test blocks. All tests, including American Society for Testing and Materials tests, have come back positive. The rock has an esthetic appearance in both polished and flamed form. The stone contains black inclusions ranging in size from 1 to 30 cm. These inclusions appear to occur sporadically throughout the body, yet not in any great concentration. In most samples they add to the natural beauty of the rock. Canadian Unique Granites hope to have the quarry in operation in the near future.

Several other companies are looking at Sudbury area stone for use as coloured landscape aggregate, precast aggregate, and terrazzo type aggregate.

Copper and nickel are not the only commodities the Sudbury area has to offer.

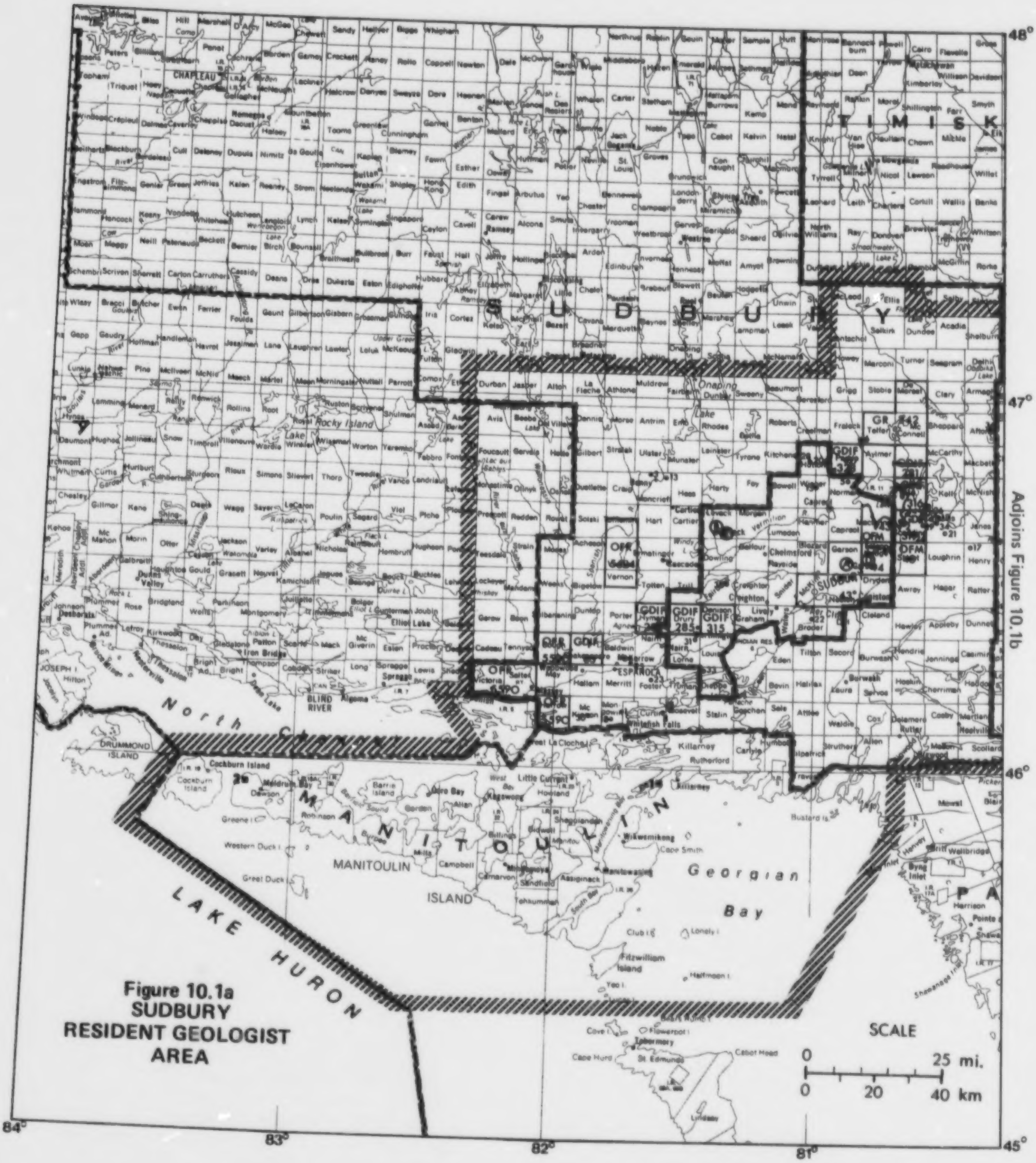
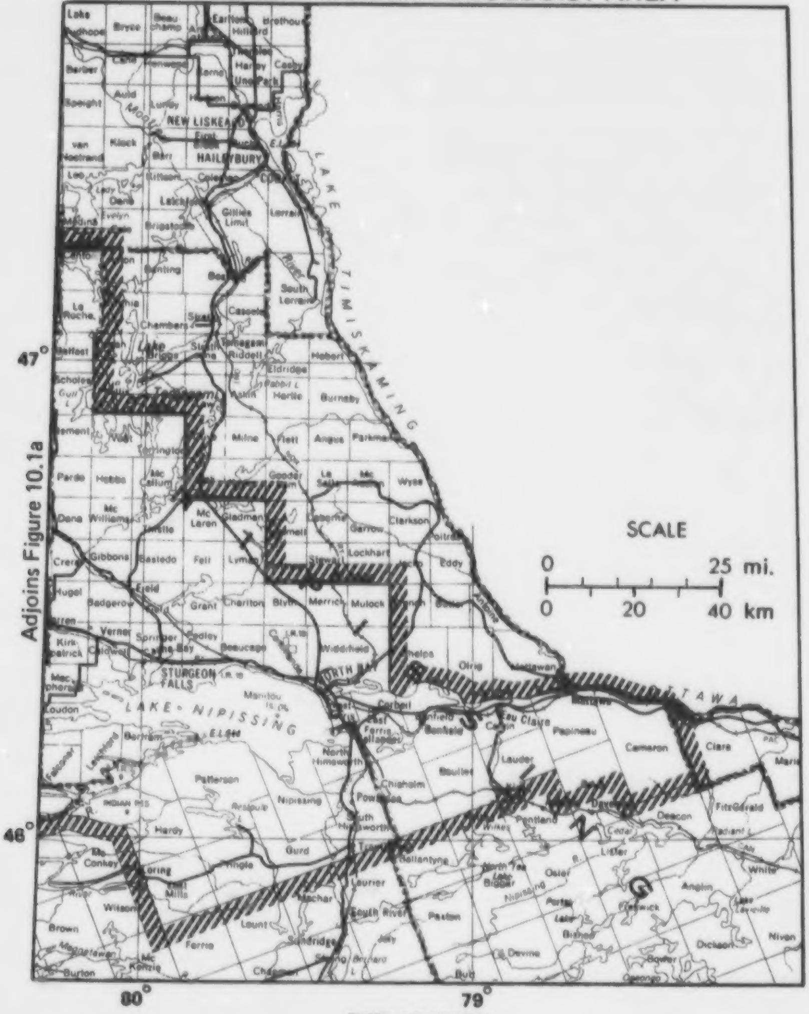

48°
47°
46°
45°
84°
83°
82°
81°
CHAPLEAU
S U D B U R Y
T I M I S K
SUDBURY
ESPANOLA
BLIND RIVER
North Channel
DRUMMOND ISLAND
Cockburn Island
M A N I T O U L I N
MANITOULIN ISLAND
Little Current
Georgian Bay
LAKE HURON
Tobermory
Killarney
Adjoins Figure 10.1b
SCALE
0
25 mi.
0
20
40 km

Figure 10.1a
SUDBURY
RESIDENT GEOLOGIST
AREA

Figure 10.1b
SUDBURY RESIDENT GEOLOGIST AREA


Adjoins Figure 10.1a
47°
46°
80°
79°
SCALE
0
25 mi.
0
20
40 km
NEW LISKEARD
HAILEYBURY
LAKE TIMISKAMING
STURGEON FALLS
LAKE NIPISSING
NORTH BAY
OTTAWA
Cameron
Clara
Papineau
Lauder
Patterson
Nipissing
Hardy
Gurd
Wilson
Brown
Ferris
Laurier
Paxton
Bishop
Dickson
Niven
Anglin
Wyse
Clarkson
Eddy
Lockhart
Mulock
Merrick
Chariton
Grant
Badgerow
Gibbons
Hugel
Crerar
Dana
Pardo
Hebert
Burnaby
Milne
Angus
Parkman
Chambers
Lorrain
South Lorrain
Gillies Limit
Bryce
Barber
Speight
Klock
Leo
Lake

EXPLANATION

•30 Exploration Activity, 1986
keyed to TABLE 10. 1

Ⓐ Location of OGS field party, 1986

A. R. L. Debicki
B. P. Brockmeyer and R. Lakomy
C. M. E. Avermann and V. Mueller - Mohr
D. B. O. Dressler

■ Producing Quarries

1. Indusmin Ltd. . . . . .silica
2. Manitoulin Dolomite . . . . dolomite

☐ Map or Report Issued by the OGS, 1986

GDIF – Geological Data Inventory Folio
OFR – Open File Report
OFM – Open File Map
GR – Geoscience Report

▨ Boundary of Resident Geologist's Area

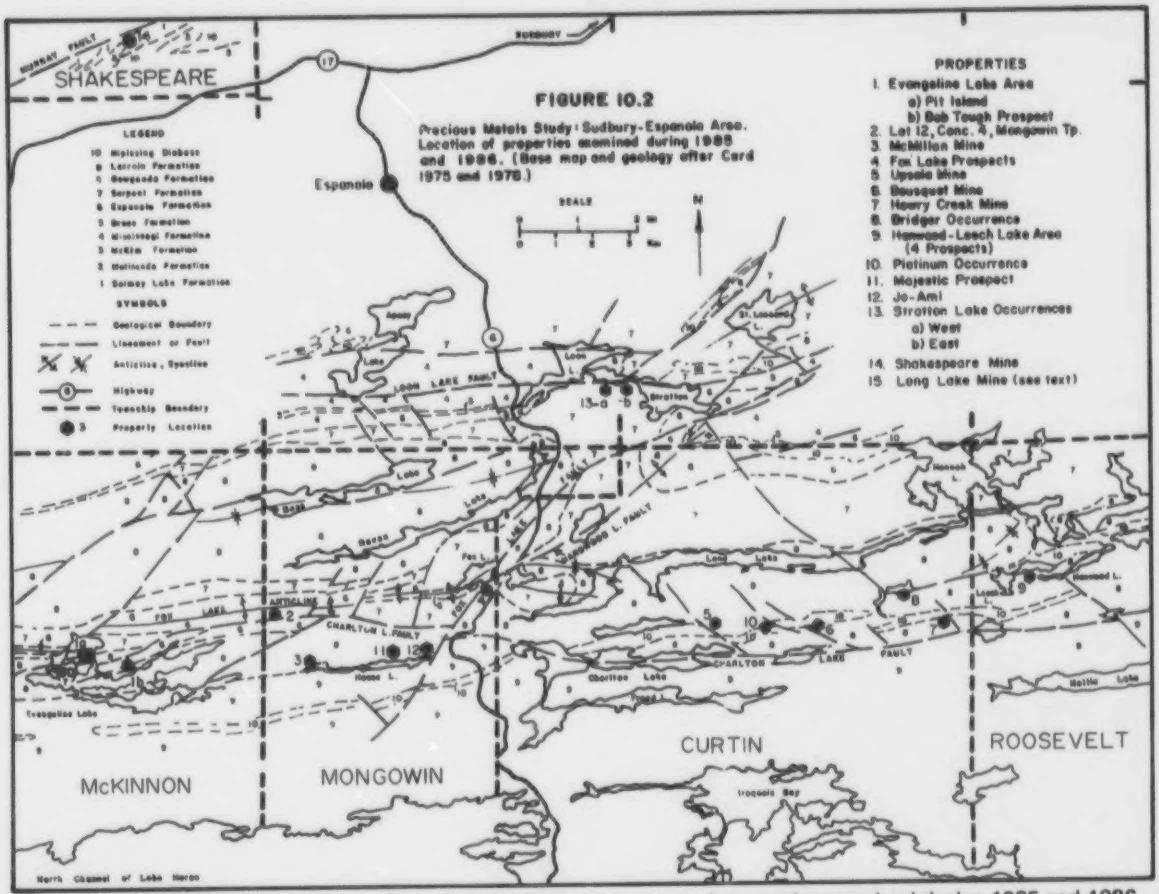


FIGURE 10.2
Precious Metals Study: Sudbury-Espanola Area. Location of properties examined during 1985 and 1986. (Base map and geology after Card 1975 and 1978.)
SCALE
N
PROPERTIES
1. Evangeline Lake Area
a) Pit Island
b) Bob Tough Prospect
2. Lot 12, Conc. 4, Mongowin Tp.
3. McMillan Mine
4. Fox Lake Prospects
5. Upsala Mine
6. Bousquet Mine
7. Henry Creek Mine
8. Bridger Occurrence
9. Harwood-Leech Lake Area (4 Prospects)
10. Platinum Occurrence
11. Majestic Prospect
12. Jo-Ami
13. Stratton Lake Occurrences
a) West
b) East
14. Shakespeare Mine
15. Long Lake Mine (see text)
LEGEND
10 Nipissing Diabase
9 Lorrain Formation
8 Gowganda Formation
7 Serpent Formation
6 Espanola Formation
5 Bruce Formation
4 Mississagi Formation
3 McKim Formation
2 Matinenda Formation
1 Salmay Lake Formation
SYMBOLS
Geological Boundary
Lineament or Fault
Anticline, Syncline
Highway
Township Boundary
Property Location
SHAKESPEARE
MURRAY FAULT
SUDBURY
17
6
Espanola
McKINNON
MONGOWIN
CURTIN
ROOSEVELT
LOON LAKE FAULT
CHARLTON L. FAULT
CHARLTON LAKE FAULT
ANTICLINE
FOX LAKE
Charlton Lake
Evangeline Lake
Iroquois Bay
Stratton
St. Leonard L.
Nellie Lake
North Channel of Lake Huron
13-a
-b

Figure 10.2. Precious metals study: Sudbury-Espanola Area. Location of properties examined during 1985 and 1986. Base map and geology after Card (1975 and 1978).

PRECIOUS METAL STUDY IN THE SUDBURY-ESPANOLA AREA by F.H. Toews

The boundaries of the Sudbury-Espanola Precious Metal Study are shown on Figure 10.2.

1986 was the second year of a two-year precious metal study in the Sudbury-Espanola Area. The purpose of this project is to examine, map, sample, and interpret known gold prospects and former producing mines found within parts of the Huronian Supergroup. Most properties examined are found within a west-trending zone extending 27 km from McKinnon Township in the west, through Mongowin and Curtin Townships, to Roosevelt Township in the east (*see* Figure 10.2, basemap and geology after Card 1975a, 1975b, 1978). Approximately 5 km north of this zone, two occurrences are found straddling the boundary of Merritt and Foster Townships on Stratton Lake; a third lies 18 km to the north in Shakespeare Township; and a fourth property is located in Eden Township (NTS sheet 41 I/6, UTM coordinates 5127750N, 488450E), 35 km northeast of the Roosevelt Township occurrences and 23 km southwest of Sudbury (not shown on Figure 10.2).

The properties were mapped on grid lines at a scale of 1 inch to 100 feet (1:1200). Grab and chip samples were collected from host rocks and vein material for major and trace element geochemical analysis.

Four of the properties examined were small producers of gold at various periods during the early 1900s and the 1930s (Gordon *et al.* 1979). These are the Shakespeare Mine in Shakespeare Township, the McMillan Mine in Mongowin Township, the Bousquet Mine in Curtin Township, and the Long Lake Mine in Eden Township.

During the 1985 season, mapping and sampling of the precious metal occurrences was confined to properties in the west-trending zone from central McKinnon Township to the eastern part of Roosevelt Township (properties numbered 1 to 10 on Figure 10.2).

During the 1986 season, six more properties were mapped and sampled. These properties are the Majestic and Jo-Ami Prospects in Mongowin Township; two showings on Stratton Lake in Merritt and Foster Townships; the Shakespeare Mine in Shakespeare Township; and the Long Lake Mine in Eden Township. Additional mapping was done at the McMillan Mine in Mongowin Township. Some of the mapping from the previous season was checked. Also, several zones of quartz stockwork to breccia in partly carbonatized and/or silicified and/or albitized (pink altered) metasediments of the Gowganda and Mississagi Formations were briefly examined along Highway 6, from East Fox Lake to Loon Lake in Curtin, Mongowin, and Merritt Townships. These zones are similar to parts of the Fox Lake Prospects, and certain similarities were also noted in and near quartz breccia zones found on the Long Lake Property, south of the mine.

With the exception of Long Lake Mine, the gold occurrences are of the vein type, comprising quartz stockwork to breccia to massive to stringers, which vary in the content of carbonate, sulphide minerals, chlorite, and hematite. At Long Lake, gold is present in disseminated pyrite, arsenopyrite, and pyrrhotite in variably recrystallized and altered quartzites of the Mississagi Formation (Baker 1917; Phemister 1939).

The host rocks for the veins at the Majestic and Jo-Ami Prospects are steeply dipping feldspathic quartzites interbedded with pelitic units of the Gowganda Formation. At the Stratton Lake occurrences, massive to sheared and brecciated feldspathic quartzites enclose the veins. On the Shakespeare Mine property, schists with variable proportions of quartz, sericite, chlorite, biotite, and garnet are interbedded with partly silicified sandstones of the Matinenda Formation which contains massive to stringer-type quartz, often highly deformed.

Major faults are associated with most of the occurrences. The northeast-striking Fox Lake Fault intersects a possible west-trending fault through House Lake at the Jo-Ami Prospect. The Fox Lake Fault is also associated with brecciated, carbonatized, silicified, and albitized zones, from the Fox Lake occurrences, northward along Highway 6 in Curtin Township. The Stratton Lake occurrences lie on the west-trending Loon Lake Fault zone, which also passes through a large brecciated, silicified, and albitized zone straddling Highway 6 to the west of Loon Lake. At the Shakespeare Mine, the east-northeast-trending Murray Fault lies immediately north of the mine. The orebody at Long Lake Mine is partially bounded by a northeast-trending, southeast-dipping fault (Phemister 1939) which may be part of the Wallingford Fault as defined by Card and Palonen (1975). Pseudotachylite veins and mylonitic veins are associated with this and other fault zones to the south of the mine. At the Majestic Prospect, northeast- to northwest-striking faults and lineaments are indicated by field evidence.

At the Majestic and Jo-Ami Prospects, northwest-trending, northeast-dipping amphibolite dikes are present; one is coincident with a possible fault at the Majestic Prospect, while the other appears to separate a zone of locally, highly auriferous quartz veins in quartzites at the Jo-Ami Prospect. This latter dike appears to have brecciated the quartzites and is itself sheared and broken up, in or near the Fox Lake Fault, along with quartzite, pelite, and some quartz veins.

Amphibolite "dikes" are found oriented parallel to stratigraphic contacts of the Matinenda Formation at the Shakespeare Mine. Some of these "dikes" may represent intercalated metavolcanics of the Salmay Lake Formation. Also, a ridge of Nipissing Diabase occurs 120 to 150 m south of the shaft.

At Long Lake Mine, a layered gabbro-diorite body of the Eden Lake Intrusions encloses a wedge of quartzite which hosts the ore.

In many of the vein occurrences, early medium to dark green chlorite alteration is often present near the veins. It may have sharp to gradational boundaries and an irregular distribution. Chloritized fragments are also observed in the veins, and chlorite forms the breccia matrix to metasediments adjacent to some amphibolite dikes.

Often iron carbonates, and sometimes calcite, are associated with vein zones, occurring in wall rocks and within the veins. At Fox Lake, early fine-grained carbonate can be observed to replace thin laminae in pelitic rocks, and is cut by later albite veinlets. A still later generation of coarse-grained carbonate invades the albitized metasediments as veins (±quartz) and rhombs, and as breccia matrix with quartz (±sulphides). A later (?) generation of quartz veins (±sulphides) appears to intrude the breccia in places.

Sulphide minerals are generally associated with quartz veining, but in highly variable amounts from nil to occasionally 50 percent. Sulphide mineralization can also be observed in the wall rocks. Pyrite is the most common sulphide mineral. Arsenopyrite, pyrrhotite, and chalcopyrite are also present. Sphalerite, associated with pyrrhotite and chalcopyrite, occurs in some of the dump material at the Shakespeare Mine. Sulphide minerals are fine to medium grained, mainly disseminated, but are locally more concentrated as disseminated to massive patches, and sometimes as veins and fracture fillings.

Although it is reported to be present on many of the properties, visible gold was only noted in several instances, one of which was in drill core from a gold-bearing zone south of the Long Lake Mine. The gold is associated with a bleb of pyrrhotite-arsenopyrite. Fuchsite may be present in this zone and it was also observed in places where sulphide mineralization occurs on the walls of an open cut at the mine site.

Visible gold was also observed to occur in association with arsenopyrite at the Howry Creek Prsopect, and with dark grey quartz and pyrite from one of the veins at Hanwood Lake.

Geochemical analyses have been completed on grab and chip samples collected during the 1985 season from the McMillan Mine and the Howry Creek properties. Major element geochemical analysis was done on the host rocks to the veins, and trace element (Au, Ag, Pt, Pd, As, Co, Cr, Cu, Ni, Pb, and Zn) contents were determined for both host rocks and veins. Analyses were done by the Geoscience Laboratories, Ontario Geological Survey, Toronto.

Some of the geochemical analyses indicate higher gold values are associated with sheared, glassy grey to black, quartz vein material accompanied by sulphide mineralization. The highest value obtained was 34.0 ppm gold (34 g/t) from a vein sample with 20 percent pyrite and minor arsenopyrite. This sample, from a pit at the McMillan Mine, also assayed 3500 ppm arsenic. Arsenic content, which generally increases near the vein zone, appears to have higher values where gold values are elevated, but the relationship is not always sympathetic. At the Howry Creek Property, a quartz-carbonate vein, with a glassy appearance and minor disseminated arsenopyrite, contained 6000 ppb gold (6 g/t) with very minor values of platinum (2 ppb) and palladium (1 ppb). These platinum group elements (PGEs) were rarely detected, and when encountered, they were quantitatively minor and associated mostly with a few samples of Nipissing Diabase. Silver content was below the detection limit of 2 ppm in all samples analyzed. Sulphide mineralized wall rock contains elevated concentrations of up to 610 ppb gold. The metasediments away from the vein zones had gold contents varying from below the detection limit of 2 ppb to a maximum of 8 ppb, while Nipissing Diabase and amphibolite dikes, not associated with quartz veining, contained up to 4 ppb gold.

BRECCIA IN SCADDING TOWNSHIP BY W. MEYER

A breccia in north-central Scadding Township (NTS sheet 41 I/10, UTM coordinates 5173500N, 532600E) is of some interest. This lies on a 19-claim property which Teckron Mines and Energy Incorporated held during 1986 under option from R. Fielding. Work by James E. Tilsley and Associates Limited exposed much of the breccia. Some observations and speculations are worth recording.

The breccia contains, at surface, a 100 by 40 m oval shaped fragment of Espanola Formation limestone. At this point the surrounding erosion level is in Gowganda Formation, but at which stratigraphic level is not clear. Depending on the thickness of the Gowganda Formation at this point, and underlying Serpent Formation, the limestone fragment occurs several tens of metres, perhaps hundreds of metres, above its point of origin.

The limestone fragment floats in a breccia with rounded fragments of diabase, paraconglomerate, wacke, siltstone, and arkose. These may be metres in diameter. The matrix is fine grained, and partly flow-banded. The breccia looks much like any one of many in the area thought to be related to the Sudbury event.

Several quartz-carbonate veins occur in the breccia around the limestone fragment, but apparently not in it. The veins contain coarse gold weighing up to 50 mg per grain (J. Tilsley, consulting geologist, personal communication, 1986). The veins are mostly about 5 cm thick. They dip in various directions and at various angles. Most dip at shallow angles.

In addition to quartz-carbonate veins, other alteration includes albitization, chloritization, and perhaps formation of calc-silicates in the limestone. So far no petrographic work has been done.

The limestone fragment has some significance. In all the many formations and thousands of metres of stratigraphic section in the Huronian Supergroup, only limestones of the Espanola Formation form a readily recognizable rock type. Therefore a fragment of Espanola Formation limestone in a breccia, high above its point of origin, suggests that vertical movement of fragments took place. Breccias associated with the Sudbury event are thought to have formed through *in situ* milling, so that little vertical movement and mixing of fragments took place. The breccia in Scadding Township looks like Sudbury breccia, but the limestone fragment suggests that much vertical movement took place. Furthermore, the quartz-carbonate veins, the gold mineralization, and other alteration suggest the presence of chemical changes not normally associated with Sudbury breccias. It may, therefore, be that not all breccias that look like Sudbury breccia are related to the Sudbury event.

Other blocks of Espanola Formation limestone, which are, or appear to be, stratigraphically out of place, occur in nearby townships.

In Parkin Township, a huge breccia, perhaps 2000 by 500 m in size, is made up mostly of rounded and angular fragments of Serpent Formation feldspathic quartzites. This contains limestone fragments from golf ball size to several tens of metres. These have clearly come from further down in the sequence. Other fragments in the breccia are fine-grained, pink, metasomatic albite, which also appear to have streamed up from below.

J. Brady (Sudbury prospector) has shown the author other limestone occurrences in Gowganda Formation in Parkin and Davis Townships. Some of these are rounded, and appear to be streamed up breccia fragments, but others are of such a size, shape, and disposition, that it is difficult to explain them being breccia fragments. A. Jerome (Sudbury prospector) reported to the author another occurrence of limestone in Gowganda Formation in Scadding Township, but this has yet to be visited.

At the moment the author regards the limestone fragments to be no more than easily recognizable indicators of vertical movement of material in breccias. Even though gold occurs near the fragment in Scadding Township, the limestone fragment in itself appears to have no economic significance. No doubt other breccias have had vertical movement of material, but without limestone fragments this is difficult to recognize. The ability to recognize vertical movement in the few breccias among the many in which it may have occurred, may be important. Vertical movement implies pressures from below, and possible hydrothermal solutions and mineralization.

Further work on these stratigraphically displaced limestone fragments is planned for 1987.

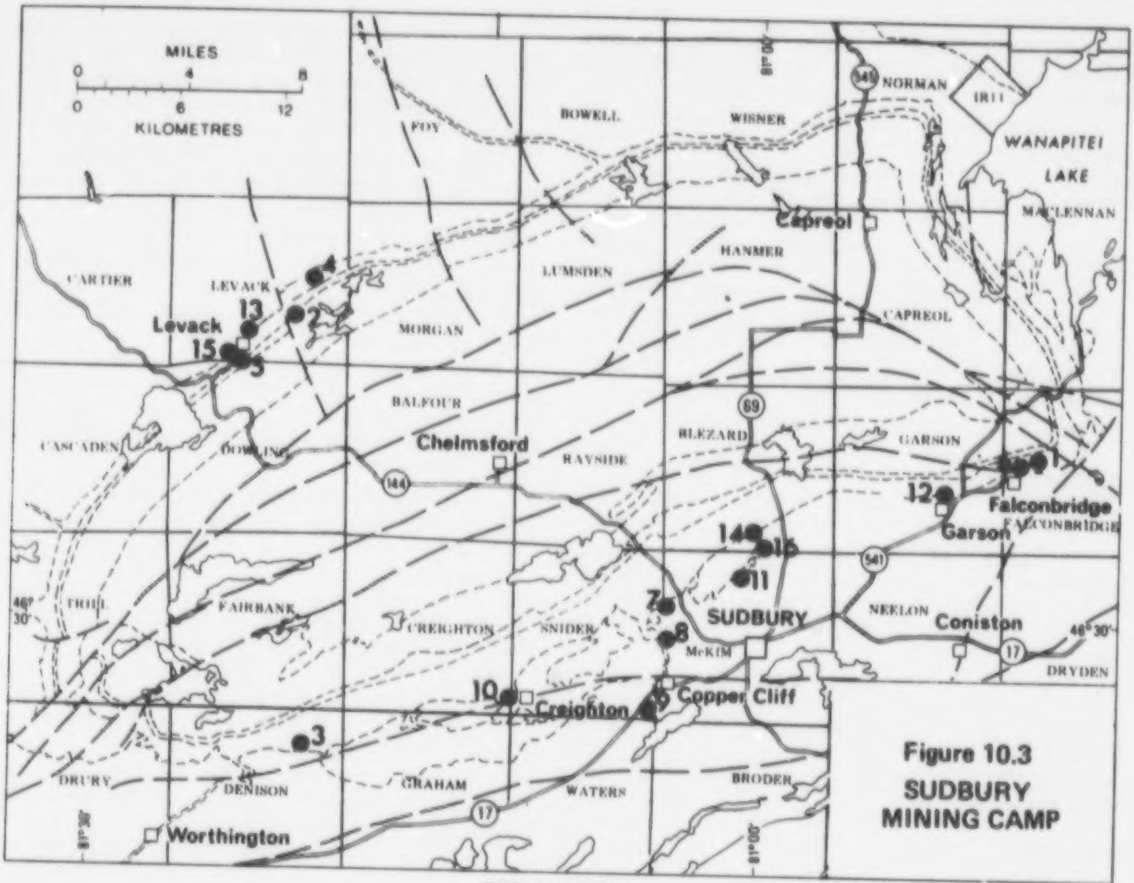
GEOLOGICAL DATA INVENTORY FOLIOS (GDIFs) by W. Meyer

In 1986, staff of the Resident Geologist Office worked on 17 GDIFs. By year end, 8 had been published, 5 were in press, and 4 were in preparation. Those published are included in Table 10.3.

MINING ACTIVITIES

SUMMARY

Nickel-copper-precious metal mining by Falconbridge Limited and Inco Limited continued to dominate mining activities in the area. Orofino Resources Limited mined gold in Davis Township, and Emerald Lake Resources Incorporated prepared the Golden Rose Mine in Afton Township for production in 1987. Other



MILES
0
4
8
0
6
12
KILOMETRES
FOY
BOWELL
WISNER
NORMAN
545
WANAPITEI
LAKE
MACLENNAN
Capreol
HANMER
CARTIER
LEVACK
LUMSDEN
MORGAN
CAPREOL
Levack
13
15
5
4
2
BALFOUR
69
CASCADEN
DOWLING
Chelmsford
144
RAYSIDE
BLEZARD
GARSON
Falconbridge
FALCONBRIDGE
12
Garson
1
6
14
16
11
541
TRILL
46° 30'
FAIRBANK
CREIGHTON
SNIDER
7
9
8
SUDBURY
McKIM
NEELON
Coniston
17
46° 30'
DRYDEN
10
Creighton
Copper Cliff
3
DRURY
DENISON
GRAHAM
WATERS
BRODER
17
81° 30'
81° 00'
Worthington

Figure 10.3
SUDBURY
MINING CAMP

EXPLANATION

Producing Mines, 1986

Falconbridge Ltd.. . . . . .Co, Ni, Cu, Pt, Au, Ag

1. East Mine
2. Fraser Mine
3. Lockerby Mine
4. Strathcona Mine
5. Onaping Mine
6. Falconbridge Open Pit No. 1 Shaft

Inco Ltd.. . .Ni, Cu, Pt, Se, Te, Co, Au, Ag, SO2, H2SO4

7. Clarabelle Open Pit
8. Copper Cliff North Mine
9. Copper Cliff South Mine
10. Creighton Mine
11. Frood Mine
12. Garson Mine and Open Pit
13. Levack Mine
14. Little Stobie Mine
15. McCreedy West Mine
16. Stobie Mine

commodities produced were silica, dolomite, and sand and gravel.

NICKEL—COPPER—PRECIOUS METALS

Inco Limited operated nine underground mines, two open pits, three mills, one smelter, two refineries, and one metal strip plant for coinage blanks. Falconbridge Limited operated five underground mines, two mills, one open pit, and one smelter in the area (Figure 10.3).

Continuing low metal prices are worrisome. At one point the price of nickel dipped to U.S. $1.68 per pound. Falconbridge Limited reported losses for the first nine months of 1986 of $21.6 million. Inco Limited was profitable, but barely so. It reported earnings of U.S. $1.8 million for the first nine months.

Inco Limited shut down operations for ten weeks during the Summer, 1986. The Garson Mine had to be temporarily closed in October due to several falls of rock.

In October Falconbridge Limited announced further cutbacks affecting about 275 persons.

Inco Limited announced that it would spend $25 million to reactivate the Crean Hill Mine as an all electric mine, and $15 million to mechanize the copper refinery tank house.

GOLD

In 1985, Orofino Resources Limited entered into a 50:50 joint venture with Groundstar Resources Limited to explore and mine that company's Norstar

Copper-Gold Prospect in Davis Township. Previous owners had reported 80 000 tons of 0.2 ounce gold per ton (6.88 g/t), and 0.86 percent copper.

In 1986, Orofino completed a 2000-foot (610 m) decline to the 315-foot (96 m) Level. The mineralized zone is an oval, pipeshaped breccia with maximum dimensions of about 100 feet (30 m). The orebody was mined out by mid-October. The ore was crushed on site to -15 cm, and trucked to the mill at the Scadding Mine, 9 km west. The mill can handle 160 to 180 tons per day. The pipe continues below the 315-foot (96 m) Level, but grades are not economic. The tons and grades recovered from the Norstar Mine had not been announced by year end.

Orofino still has one undeveloped underground orebody on its Scadding Township Property.

Emerald Lake Resources Incorporated made a decision to develop the Golden Rose Mine for production. The ore consists of quartz-carbonate-pyrite veins and stockwork in Archean oxide iron formation.

By December 1986, site preparation was well advanced, foundations for the mill had been poured, mill equipment had reached the site, and a decline was being driven. Preproduction expenditures will be about $10 million.

Production is scheduled for the Spring of 1987 at a rate of 400 tons per day. Ore reserves in October 1986 were 377 000 tons at 0.225 ounce gold per ton proven, 280 300 tons at 0.186 ounce gold per ton probable, and 1.8 million tons at 0.247 ounce gold per ton possible.

INDUSTRIAL MINERALS

Indusmin Limited continued to operate its Badgeley Island Quarry in Georgian Bay. Silica is being produced from the Bar River Formation of the Huronian Supergroup. The company expected to ship about 400 000 tons to its plant at Midland.

Manitoulin Dolomite was taken over by Canada Cement in May of 1986. The company produces about 12 size grades of dolomite from a quarry in the Amabel Formation in Dawson Township at the western end of Manitoulin Island. The company expected to ship between 1.3 and 1.4 million tons in 1986. The products move by ship to Great Lakes ports, mostly west of the Welland Canal. About half stays in Canada, the rest goes to U.S. customers.

Ethier Sand and Gravel opened a new silica quarry in Cosby Township in late September. Using mobile equipment the company was in operation within a few days, and began to ship about 2000 tons per day of silica for flux to Inco Limited's operations in Sudbury.

EXPLORATION ACTIVITIES

Low metal prices continued to keep claim staking at a subdued level, even though it was up from the year before. Between January 1 and November 30, 1143 claims were recorded, compared with 920 in the same period of 1985.

Figure 10.4 compares yearly claim staking from 1973 to the end of 1986.

The two major mining companies in the Sudbury area continued to explore their properties. Much of this work is thought to have been directed at nickel-copper mineralization with elevated platinum group element (PGE) content to sweeten the mill feed.

Most work outside of the Sudbury Structure continued to be directed at gold. Even though mafic intrusions around the Sudbury Structure have PGE potential, only limited interest was shown in this.

Exploration Activity is summarized in Table 10.1, and Assessment Work filed in 1986 is listed in Table 10.2. Some of the projects visited, and highlights known to this office are as follows:

Inco Limited and Falconbridge Limited took out permits to do work, including diamond drilling, in Garson, Blezard, Broder, Denison, and Levack Townships. This is on patented land, and few details are known to this office.

Falconbridge Limited drilled deep holes in Blezard Township, to further explore the Lindsley Property.

Falconbridge Limited also drilled about 1525 m in four holes on patented land in northeastern Shakespeare Township, to test for depth extensions to known nickel-copper mineralization.

Inco Limited drilled several areas in Denison Township, at the southwestern end of the Sudbury Structure. The target here is thought to have been PGE-enriched nickel-copper mineralization.

W. Klenk had a magnetic survey flown over parts of Manitoulin Island. On the basis of this he drilled a 276 m oil well 1 km northwest of Sandfields. The Trenton Formation was intersected at 238 m. The hole contains brine, but only traces of oil and natural gas. By year end the hole was to have been deepened to the pre-Paleozoic basement, expected to lie at about 365 m.

Loki Resources Incorporated continued work on the McMillan Mine in Mongowin Township during the first three months of 1986. Loki dewatered the mine from the 625-foot (191 m) Level to the 875-foot (267 m) Level, mapped and sampled the accessible parts, and then allowed the mine to flood again. Loki then optioned the property to Dassen Gold Resources Limited, who can earn a 100 percent interest in the 38 claim property for 300 000 Dassen shares, and by bringing the property to the feasibility stage by 1989. No more work was done in 1986.

Stringer Explorations Limited drilled 400 feet (122 m) in three holes on the Jo-Ami Prospect in Mongowin Township. No assays were available at year end.

United Reef Petroleums Limited collected samples from the dump of the old Nickel Offset Mine in Foy Township, and assembled all available information. This is the start of a program to find PGE-enriched nickel-copper mineralization. The company controls several kilometres of strike length of the Foy offset dike.

Reedmac Prospecting Syndicate drilled south of the shut-down Moose Mountain Iron Mine in Hutton Township, in an area of Archean granite and greenstone. One hole cut well mineralized sections with

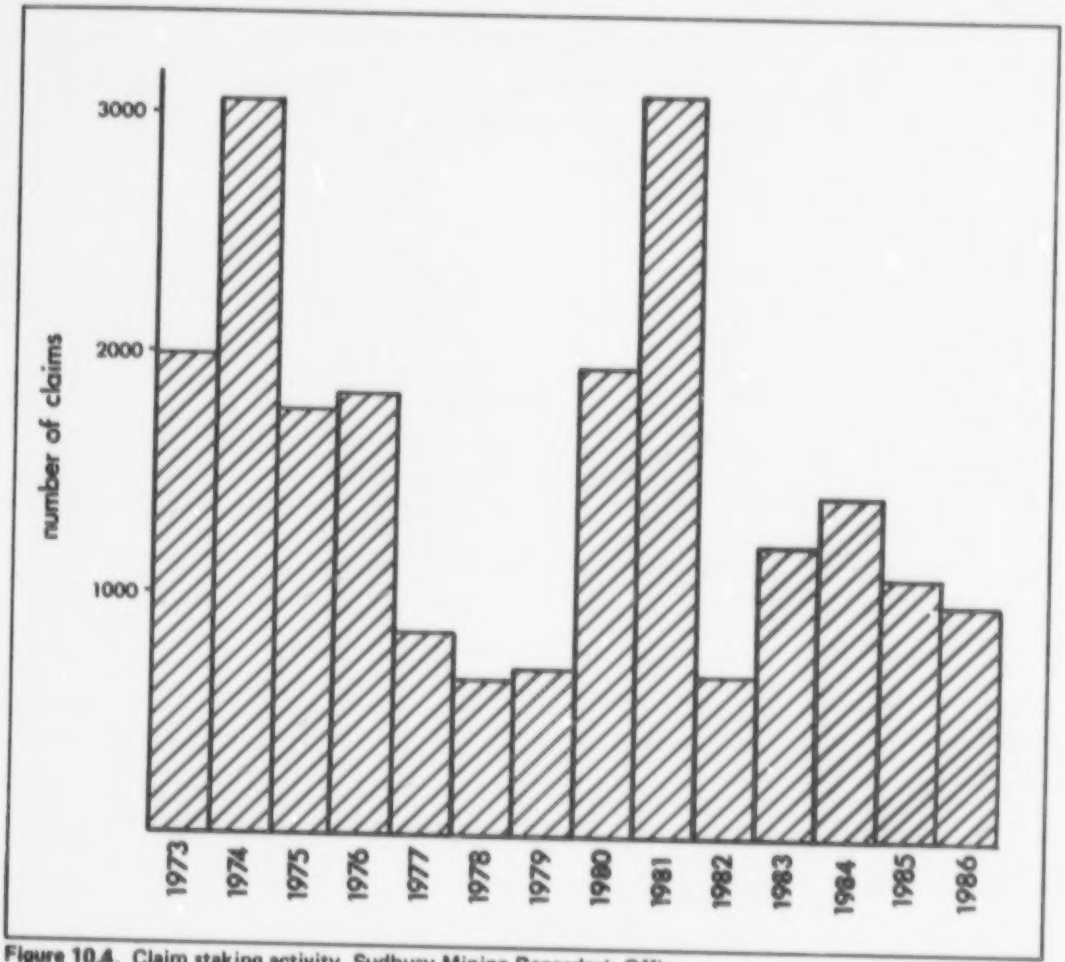


Figure 10.4. Claim staking activity, Sudbury Mining Recorder's Office.

pyrite, pyrrhotite, chalcopyrite, and traces of sphalerite.

Raretech Minerals Incorporated drilled five short holes on claim S734706 in Parkin Township on property optioned from J. Brady. The target was a lens of massive calcite, which stripping had shown to be about 40 m long and 20 m wide. Drilling established about 15 000 tons of varying purity, in what appears to be a pipeshaped deposit.

A small lens of massive sulphide occurs at depth. This contains between 0.2 percent and 0.55 percent copper, 150 to 190 ppm nickel, between 540 and 600 ppm cobalt, and trace gold. Raretech returned the property to J. Brady.

This deposit is something new in our area. It is marginal to a large breccia, which may be 2000 m long and 500 m wide. In this breccia calcite is a common, though localized, matrix. The breccia also contains many fragments of fine-grained, pink, metasomatic albite, which elsewhere in the Sudbury area is associated with gold (e.g. Orofino's Scadding Mine in Scadding Township, and the Fox Lake Prospect in Mongowin Township).

Falconbridge Limited optioned property from J. Brady in Parkin Township, and drilled 1494 m in 18 holes. The purpose of the program was to find PGE-enriched nickel-copper mineralization in the Parkin offset dike. Trenching and drilling extended the dike 2 km further northeast than previously known. Falconbridge returned the claims to J. Brady late in 1986.

Hecla Mining Company of Canada completed a second winter program at Wolf Lake in Mackelcan Township. The company has the property under option from Flag Resources (1985) Limited. In early 1986, Hecla drilled 4520 feet (1378 m) in 4 deep vertical holes from the ice on Wolf Lake. The deepest hole went to 1347 feet (411 m). Hole 86-1 intersected 1.5 feet (0.46 m) with 19.3 ounces gold per ton (664 g/t). The drilling suggests that the mineralized zone strikes northeast and dips southeast. Flag Resources continued to be the third largest claim holder in the area after Falconbridge Limited and Inco Limit-

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 10.1

Number on Figure	Individual or Company	Activity
1	Allard, J.	Power STr
2	Arthurian Resources Ltd.	DD
3	Barry, A.	Manual Work
4	Blue, P. G.	Manual Work
5	Brady, J.	Manual Work and Power STr
6	Brady, R. H.	Manual Work
7	Butler, R. C.	Manual Work and Shaft Sinking
8	Elliot, A. T.	Geophys
9	Falconbridge Ltd.	DD
10	Fielding, R.	Geophys
11	Green, R. C.	DD
12	Guiding Resources Ltd.	Tr, DD
13	Huycke, G.	Geophys
14	Ike Burns Exploration Corp.	DD
15	Inco	DD
16	Jerome, A. E.	Geochem, Geophys, DD
17	Leblanc, A.	DD
18	Loki Resources	STr, Manual Work
19	Loney, T. P.	Geophys
20	Maki, O.	Manual Work
21	Marion, M.	Manual Work
22	Marslon Investments Ltd.	Power STr
23	Maples, K. V.	Geophys
24	Orofino Resources Ltd.	Geochem
25	Owen, J.	Feasibility Study, Stone
26	Plexman, E. J.	Geolog and Power STr
27	Raretech Minerals Inc.	DD
28	Reed, E.	DD
29	Sims, W.	DD
30	Stringer Explorations Ltd.	Geophys
31	Tamminen, T.	Manual Work
32	Tracanelli, H. J.	Manual Work
33	Uranex Resources Ltd.	Geolog
34	Vanlith, G.	Power STr and Manual Work
35	White, J.	SA
36	Wright, R. J.	Geophys, DD

TABLE 10.2

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Broder	41 I/6	Marelen Investments Ltd.	Au	Non Assess	Power STr, Manual Work	1986		#0012-A1
Caen	41 I/3	Blue, Peter G.	Au	Non Assess	Manual Work	1986		#0011-A1
Clary	41 P/2	Inco Limited	Au	Assess	DD Summary	1985		
Clary	41 P/2	Noranda Exp. Co. Ltd.	Au	Assess	DD Boreholes	1985	LO.14882	#0012
Fairbank	41 I/11	Tracanelli, H. J.	Au	Non Assess	Manual Work	1986		#0019-A1
Fraleck	41 I/15	Leschishin, E.	Au, Ag	Assess	SA	1983	OM83-8-I-139	#0014-A1
Hart	41 I/12	Jedburgh Resources Limited	Cu, Zn, Co, Ag, Au	Assess	Geophys, Geochem, Mag, EM, VLF	1985	2.8369	#0016
Mackelcan	41 I/15	Flag Resources Ltd.	Au, Cu	Assess	Wolf Lake Joint Venture, Maps DD	1984		#0027
Mackelcan	41 I/15	Hecla Mining Company of Canada	Au	Assess	DD 5 4505'	1985	DD16	#0025
Mackelcan	41I/15	Jerome, Albert E. Flag Resources Ltd.	Au	Assess	Geophys, EM, Mag	1985	2.8580	#0026
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Geophys, Geolog, VLF	1985	2.8642	#0030
Mongowin	41 I/4	Loki Resources Inc.	Au	Assess	Manual work, power, STr	1986	WK RPT	#0025-A1
Parkin	41 I/15	Brady, John	Ni, Cu, PGEs	Assess	DD 8 1694.5	1983	DD37	#0045-A1
Parkin	41 I/15	Leschishin, E.	Au	Assess	SA	1983	DD37	#0045-C1
Rathbun	41 I/15	Flag Resources (1985) Limited	Au	Assess	DD 1 494	1985	DD22	#0038-A1
Rathbun	41 I/15	Flag Resources (1985) Limited	Au	Assess	DD 5 1225	1985	DD023	#0039
Scadding	41 I/10	Atoba Mines Linc.	Au	Assess	Qualifying Report	1981	OM83-8-C-194	#0052
Scadding	41 I/10	Butler, R. C.	Au	Assess	Shaft Sinking	1983		#0046-A1
* Baldwin	41 I/5	Barry, Alan	Au	Assess	Compressed Air, Manual Work	1986		#0054-A1
Broder	41 I/6	Marelen Investments Ltd.	Au, Ag, Cu Ni, Zn, Co	Assess	SA	1986	2.8863	#0013-A1
Caen	41 I/3	Blue, David G.	Au	Assess	Compressed Air	1986		#0012-C1
Caen	41 I/3	Blue, Don R.	Au	Assess	Compressed Air Manual Work	1986		#0012-D1
Caen	41 I/3	Blue, Peter G.	Au	Assess	SA	1985	2.8921	#0012-A1
Curtin	41 I/4	Elliot, A. T.	Au, As, Ag	Assess	SA	1985	2.8947	#0024-A1
Curtin	41 I/4	Elliot, Art	Au	Assess	Geophys	1985	2.8982	#0024-B1
Davis	41 I/10	Brady, Marie	Au	Assess	STr, trenching	1985	63.4470	#0059-C1
Davis	41 I/10	Guiding Resources Ltd.	Au	Assess	Geophys	1985	2.9125	#0059-A1
Davis	41 I/10	Palkovits, Mike Falconer, John	Au	Assess	Geolog	1985	2.9073	#0060
Davis	41 I/10	Premier Explorations Inc., Pelangio Larder Mines	Au, Ag, As	Assess	Geophys, Geolog, SA	1985	2.8763	#0061

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Davis	41 I/10	Vanlith, George	Au	Assess	Manual Work, Compressed Air	1986		80062-A1
Davis	41 I/10	Vanlith, George	Au	Assess	Power STr	1986		80062-A6
Davis	41 I/10	Vanlith, George	Au	Assess	Manual Work, Compressed Air, Power STr	1986		80062-B1
**								
Afton	41 I/16	Wright, R. J.	Au	Assess	Geophys, EM, Mag	1986	2.9289	
Afton	41 I/16	Wright, R. J.	Au	Assess	DD 3 603	1986		
Caen	41 I/3	Blue, David G.	Au	Assess	SA	1986	2.9191	
Caen	41 I/3	Blue, David G.	Au	Assess	Manual Work	1986		
Curtin	41 I/4	Elliott, Art	Au	Assess	Geophys, Mag	1986	2.9355	
Curtin	41 I/4	Elliott, Arthur T.	Au	Assess	Geophys, I.P.	1986	2.9450	
Davis	41 I/10	Canadian Nickel Company Limited	Au	Assess	Geolog, SA	1985	2.9327	
Davis	41 I/10	Guiding Resources Limited	Au	Assess	DD 4 1700	1986		
Davis	41 I/10	Guiding Resources Limited	Au	Assess	STr, trenching	1986		
Davis	41 I/10	Guiding Resources Limited	Au, Ag	Assess	DD 2 800	1986		
Davis	41 I/10	Marion, Maurice	Au	Assess	Manual Work	1986		
Davis	41 I/10	Marion, Maurice	Au	Assess	Compressed Air	1986		
Davis	41 I/10	Pelangio-Larder Mines	Au	Assess	Power STr	1986		
Davis	41 I/10	Plewman, Eric J.	Au	Assess	Power STr	1986		
Davis	41 I/10	Plewman, Eric J.	Au	Assess	Geolog	1986		
Davis	41 I/10	Van Lith, G.	Au	Assess	Compressed Air	1986		
Davis	41 I/10	Van Lith, G.	Au	Assess	Compressed Air	1986		
Davis	41 I/10	Van Lith, G.	Au	Assess	Compressed Air	1986		
Davis	41 I/10	Van Lith, G.	Au	Assess	Manual Work	1986		
Davis	41 I/10	Van Lith, G.	Au	Assess	Manual Work	1986		
Davis	41 I/10	Van Lith, George	Au	Assess	Manual Work	1986		
Dieppe, Truman	41 I/10	Uranex Resources Ltd.	Au	Assess	Geolog	1986	2.9568	
Ermatinger	41 I/12	Green, Ronald C.	Au, Cu, Ni	Assess	DD 2 281	1986		
Falconbridge	41 I/10	Gilbert, Jacques	Au	Assess	Geophys, EM, VLF, Mag	1985		
Foster	41 I/4	Naples, Kenneth V.	WO_3	Assess	Geophys, Mag, VLF	1986		
Fraleck	41 I/15	Brady, R. H.	Au	Assess	Manual Work	1986		
Fraleck	41 I/15	Brady, R. H.	Au	Assess	Compressed Air	1986		
Hallam	41 I/4	Offset Natural Resources Ltd.	Au	Assess	Geolog, Geophys, Mag, EM, VLF	1985	2.8781	
Henry	41 I/9	Leblanc, Albert	Au	Assess	DD 1 112	1986		
Hess	41 I/12	Noranda Exploration Company Limited	Zn, Pb	Assess	Geophys, Mag, EM	1985	2.9168	
Hess	41 I/12	Noranda Exploration Company Limited	Zn, Pb	Assess	SA	1985	2.9168	
Hess	41 I/12	Noranda Exploration Company Limited	Zn, Pb	Assess	Geolog	1985	2.9168	
Hess	41 I/12	Noranda Exploration Company Limited	Zn, Pb	Assess	Geochem	1985	2.9168	
Hutton	41 I/14	Maki, Oliver	Au	Assess	Manual Work	1986		
Hutton	41 I/14	Maki, Oliver	Au	Assess	Manual Work	1986		
Hutton	41 I/14	Reed, Edward	Zn, Pb	Assess	DD 1 106	1986		

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Killarney	41 I/3	Falconbridge Limited	Si	Assess	SA of drill core	1986	2.9120	
Killarney	41 I/3	Falconbridge Limited	Si	Assess	DD	1986		
Lorne	41 I/6	Tamminen, T.	Au	Assess	Compressed Air	1986		
Lorne	41 I/6	Tamminen, T.	Au	Assess	Manual Work	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Microscopic	1983	2.8478	
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Plane Table	1985	2.8584	
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Compressed Air	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Manual Work	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Compressed Air	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Metallurgical	1986	2.9505	
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	SA, Metallurgical	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Power Str	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Manual Work	1986		
Maclennan	41 I/10	Sheppard, Thomas	Au	Assess	Manual Work	1986		
McKinnon	41 I/4	Stringer Explorations Ltd.	Au	Assess	Geophys. Mag, EM, VLF	1986	2.9313	
Moncrieff	41 I/13	Brady, John	Zn, Pb	Assess	Power Str	1986		
Moncrieff	41 I/13	Huycke, George	Zn, Pb	Assess	Ground Geophysics	1986	2.9013	
Moncrieff	41 I/13	Noranda Exploration Company Limited	Zn, Pb	Assess	Geophys. Mag	1986	2.9348	
Mongowin	41 I/4	Allard, John	Au	Assess	Power Str	1986		
Mongowin	41 I/4	Stringer Explorations Ltd.	Au	Assess	Geophys. Mag	1986		
Mongowin	41 I/4	Stringer Explorations Ltd.	Au	Assess	Geophys. VLF	1986	2.9180	
Mongowin	41 I/4	Stringer Explorations Ltd.	Au	Assess	Geophys. VLF	1986	2.9181	
Nairn	41 I/5	Owen, James	Stone	Assess	Feasibility Study	1986		
Norman	41 I/15	Brady, J.	Zn	Assess	Manual Work	1986		
Norman	41 I/15	Brady, John	Zn	Assess	Manual Work	1986		
Norman	41 I/15	Brady, John	Zn	Assess	Compressed Air	1986		
Norman	41 I/15	Brady, John	Zn	Assess	Manual Work Compressed Air	1986		
Parkin	41 I/15	Brady, John	Ni, Cu, PGE	Assess	Compressed Air	1985		
Parkin	41 I/15	Brady, John	"	Assess	Compressed Air	1985		
Parkin	41 I/15	Brady, John	"	Assess	SA	1985		
Parkin	41 I/15	Brady, John	"	Assess	Compressed Air	1986		
Parkin	41 I/15	Brady, John	"	Assess	Compressed Air	1986		
Parkin	41 I/15	Brady, John	"	Assess	Compressed Air	1986		
Parkin	41 I/15	Falconbridge Limited	Fe, Ni, Cu	Assess	DD 3 1749	1986		
Parkin	41 I/15	Haretech Minerals Inc.	Calcite	Assess	DD 8 1458.5	1986		
Rathbun	41 I/15	Flag Resources (1985) Limited	Ni, Cu, PGEs	Assess	Geolog	1986		
Rathbun	41 I/15	Jerome, A. E	Ni, Cu, PGEs	Assess	Geochem, Mag	1986		
Rathbun	41 I/15	Jerome, A. E., Jr.	Cu, Ni, Au, Pt, Pd	Assess	DD 2 272.5	1986		
Rathbun	41 I/15	New Augarita Porcupine Mines Limited	Au	Assess	DD	1984		
Rathbun	41 I/15	Sims, William	Au	Assess	DD 1 285.6	1986		
Roosevelt	41 I/4	White, James	Au	Assess	SA	1986		

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Scadding	41 I/10	Arthurian Resources Ltd.	Au	Assess	SA	1985		
Scadding	41 I/10	Arthurian Resources Limited	Au	Assess	DD	1986		
Scadding	41 I/10	Butler, R. C.	Au	Assess	Manual Work	1986		
Scadding	41 I/10	Butler, R. C.	Au	Assess	Compressed Air	1986		
Scadding	41 I/10	Butler, R. C.	Au	Assess	Shaft sinking	1986		
Scadding	41 I/10	Fielding, Rodney	Au	Assess	Geophys, EM, Mag	1986	2.8981	
Scadding	41 I/10	Ike Burns Exploration Corp.	Au	Assess	DD 3 846	1986		
Scadding	41 I/10	Loney, Terry P.	Au	Assess	Linecutting, Geophys, VLF, Mag	1986		
Scadding	41 I/10	Orofino Resources Limited	Au	Assess	Geochem	1986		
Street	41 I/10	Coyne, Glenn	Au	Assess	Geophys, Mag, EM, VLF	1985		
Truman	41 I/4	Uranez Resources Limited	Au	Assess	Geophys, EM, Mag, VLF	1986	2.9300	
Wisner	41 I/14	Inco Limited	Ni, Cu	Assess	Geophys, EM	1985		
Wisner	41 I/14	Inco Limited	Ni, Cu	Assess	DD 1 271	1986		
Wisner	41 I/14	Inco Limited	Ni, Cu	Assess	DD as above	1986		

* Assessment work received after start of table.

** Assessment work reports received

ed. Most of the company's holdings are north and east of Lake Wanapitei. In 1986, the company drilled a copper-nickel-precious metals occurrence at the southern end of Rathbun Lake, in Rathbun Township. The company also drilled a magnetic anomaly on Rathbun Lake. Nothing of interest was found.

Ike Burns Metals Incorporated drilled three holes on the Alwyn Porcupine Prospect in Scadding Township. One hole was drilled into underground workings, and thereby missed the mineralized zone. The other two intersected narrow sections of quartz-carbonate veins with some chalcopyrite. No assays were available at year end.

Teckron Mines and Energy Incorporated optioned 19 claims in Scadding Township from R. Fielding. The company carried out line cutting, magnetic, and VLF electromagnetic surveys, mapping, humus sampling, stripping, outcrop sampling, and assaying. By year end, the company had not decided whether to drill. An unusual gold-bearing structure occurs on the property. This is more fully described under Staff Activities.

Maclan Exploration Incorporated worked on claims in northwestern Davis Township. Most of the work was concentrated on several parallel quartz veins in a gabbro on claim S605100. The company mapped, stripped, trenched, drilled, sampled, and assayed. Veins strike northwest, and dip steeply southwest. The E and F veins have each been blasted for about 100 m. The veins are rarely more than 30 cm wide, and are of dark bluish quartz. Sulphide minerals are erratically distributed. Good gold values are apparently concentrated in sulphide minerals, and therefore have similar erratic distribution.

ONTARIO GEOLOGICAL SURVEY

Publications released by the Ontario Geological Survey in 1986 which relate to this area are listed in Table 10.3.

PRECAMBRIAN GEOLOGY PROGRAM

R.L. Debicki worked on Huronian stratigraphy northeast of Sudbury. The purpose was to study stratigraphy and paleoenvironment of the Huronian Supergroup in the Southern Cobalt Plate, and to identify possible paleoplacer gold. Preliminary results are published in Summary of Field Work and other Activities 1986 (Debicki 1986a), and as an Open File Map (Debicki 1986b).

P. Brockmeyer and R. Lakomy continued to work on Footwall Breccia and the Onaping Formation in the Levack area. Their preliminary results are published in Summary of Field Work and Other Activities 1986 (Brockmeyer and Lakomy 1986).

M.E. Avermann and V. Mueller-Mohr worked on contact metamorphism of footwall rocks and Sudbury breccias in the Levack area. Their preliminary findings are published in Summary of Field Work and Other Activities 1986 (Avermann and Mueller-Mohr 1986).

B.O. Dressler completed mapping of Falconbridge Township. A preliminary report is found in Summary of Field Work and Other Activities 1986 (Dressler 1986a) and as an Open File Map (Dressler 1986b).

TABLE 10.3: MAPS AND REPORTS PERTAINING TO THE SUDBURY RESIDENT GEOLOGISTS AREA PUBLISHED DURING 1986 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports	
OFR 5624	Geology of Tofflemire, Venturi and Veron Townships
OFR 5590	Aggregate Resources Inventory of the Massey Area
OFM 43	Stratigraphy and Mineral Potential of the Huronian Supergroup, Southern Cobalt Embayment
OFM 44	Precambrian Geology of Falconbridge Township
Geological Data Inventory Folios	
GDIF 281	Mackelcan Twp.
GDIF 282	Hyman Township
GDIF 283	Shakespheare Township
GDIF 285	Drury Township
GDIF 315	Denison Township
GDIF 316	Rathbun Township
GDIF 317	Scadding Twp.
GDIF 323	Parkin Township
Preliminary Maps	
P.681	Burwash Area
P.751	Quaternary Geology and Industrial Mineral Resources of the Sudbury Area
P.2960	Precambrian Geology of Tofflemire, Venturi, and Vernon Townships, Sudbury District
P.2987	Paleozoic Geology of Cockburn Island, District of Manitoulin
Branch Publications	
MP 128	Report of Activities 1985 Regional and Resident Geologists
MP 132	Summary of Field Work and Other Activities, 1986
GR 242	Geology of the Chiniguchi Lake Area, District of Sudbury

GEOPHYSICS/GEOCHEMISTRY PROGRAMS

J.A.C. Fortescue and H. Stahl sampled 150 lakes northeast of Sudbury as part of the Northern Lakes Interdisciplinary Study. The Ontario Geological Survey and four other organizations are involved in this. The purpose of this study is to aid in mineral resource appraisal and to investigate the history of lake acidification. A short report describing the program is published in Summary of Field Work and Other Activities 1986 (Fortescue and Stahl 1986).

GEOSCIENCE RESEARCH GRANT PROGRAM

Three projects funded by the Ontario Geoscience Research Grants Program lie wholly or partly within the area of the Sudbury Resident Geologist.

B.R. Rust and M.J. Shields studied sedimentology and stratigraphy of the Bar River Formation in the Killarney area, as part of a more widely ranging study of this formation. For details *see* Rust and Shields (1986).

P.C. Lightfoot, D. Conrod, A.J. Naldrett, and N.M. Evensen worked on the economic potential of Nipissing Diabase in three areas. The Bonanza Lake Intrusion, south of Wanapitei Lake, is included in their study. For details *see* Lightfoot *et al.* 1986.

W.M. Schwerdtner and W. Shanks began a multiyear structural analysis of the Sudbury Structure.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

Twenty-two agreements were in force with individuals and companies for part or all of 1986 under OMEP. Planned expenditures under these agreements amount to $1 645 000. These will qualify for $404 254 of OMEP assistance.

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11. Huntsville Resident Geologist Area, Algonquin Region

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INTRODUCTION

In April of 1986, the minerals program was taken out of the Ministry of Natural Resources and combined with the Ministry of Northern Affairs to create a new Ministry, the Ministry of Northern Development and Mines. Due to space limitations in Huntsville, the Resident's office was relocated to Dorset in May.

A three-year program, with planned expeditures of $2 million, was initiated in 1986 under the Canada-Ontario Mineral Development Agreement (COMDA). A major component of this program is a project to evaluate the industrial and rare earth mineral potential of the Parry Sound-Muskoka-Nipissing area.

Exploration activity for industrial minerals, precious metals, and platinum group elements was the main activity by mining companies and prospectors during 1986. The emphasis was on graphite, silica, building stone, gold, and platinum. Claim staking showed a noticable increase over 1985, with 244 claims recorded.

RESIDENT GEOLOGIST'S ACTIVITIES

The office of the Resident Geologist for the Algonquin Region is located in Dorset, about 30 km southeast of Huntsville. The office is staffed by David Villard, Resident Geologist; Mary Garland, Chris Marmont, and Marc Johnston, contract geologists; and Valerie McEachern, secretary.

As in previous years, much of the Resident Geologist's time was spent on consultative duties, with requests for information or assistance coming from companies and individuals engaged in mineral exploration and development in the area.

Mary Garland completed her study of the graphite potential of the Central Gneiss Belt and her report will be published early in 1987.

Chris Marmont and Marc Johnston initiated a three-year study in June, 1986, funded under COMDA, to evaluate the industrial mineral and rare earth potential of the Parry Sound-Muskoka-Nipissing area. It will also be integrated with a planned study to evaluate the platinum group element potential of the area.

A project to computerize most of the commodity information in the Resident Geologist's files continued through 1986, with a major rewrite of the program. A substantial amount of information will be added to the computer database in 1987.

A program of mineral education continued with sessions in several Provincial Parks, public schools, and the Leslie M. Frost Natural Resources Centre. A July session at the Frost Centre on gold panning attracted over 200 local area residents and tourists.

INDUSTRIAL MINERAL AND RARE EARTH ELEMENT STUDIES

Under the terms of COMDA, which is a subsidiary agreement to the Regional and Economic Development Agreement (ERDA) signed by the governments of Canada and Ontario, a study was initiated to evaluate the industrial mineral and rare earth element potential of the Parry Sound-Muskoka-Nipissing area. This is a three-year project which was initiated in the Spring of 1986, and is scheduled for completion in 1989.

The objectives of the program are:

1. To test known occurrences of anorthosite, (a) for potential use as a source of high-alumina ceramic material; (b) as a potential host for titanium or vanadium; and (c) as a source of aluminum. Additional elements of interest are phosphorus, chromium, manganese, and platinum group elements. Some varieties of anorthosite may have potential as a source of building stone.
2. To re-evaluate known occurrences of marble, (a) as a potential source of basic refractories; (b) for use in the filler industries; (c) for use as a flux; and (d) as a source of lime. Some varieties may have possibilities for use as building or decorative stone. Associated minerals with economic potential include talc and tremolite. Some marble occurrences are believed to be dolomitic.
3. To investigate pegmatite occurrences, (a) as a source of rare earth elements; (b) high purity silica; and (c) potash feldspar.
4. To evaluate various rock types as sources of stone for use in a variety of applications in the building and construction industries and as decorative and ornamental stone.
5. To investigate the occurrence of other industrial rocks and minerals known to occur in the western part of the Central Gneiss Belt and to evaluate their economic potential. Graphite is one of the more promising targets in the project area. Other mineral occurrences of potential interest occurring in the area include garnet and kyanite.

The program will (a) detail the geology of known mineral deposits and occurrences, and appraise their economic potential; and (b) provide a base of lithochemical and, where appropriate, physical characteristics of the industrial rocks and minerals. The results of these studies will be published in annual progress reports in the Springs of 1987 and 1988. A final report will be published in 1989.

This work will be coordinated with ongoing geological mapping programs conducted by the Precambrian Geology Section and Engineering and Terrain Geology Section of the Ontario Geological Survey, and by the Geological Survey of Canada, all of which are part of the COMDA program. Some aspects of the research conducted by the Industrial Minerals Section of the Mineral Development and Lands Branch of the Mines and Minerals Division, under another aspect of the COMDA program, will also have some impact upon the later stages of this project.

The current year's field work was directed primarily toward reconnaissance of previously identified targets, such as anorthosite, selected marble and pegmatite occurrences, potential dimension stone sites, a cross section of mineral occurrences, and an overview of the regional geology, in order to establish priorities for the duration of the program.

Reconnaissance traverses have been completed over the White-tone and Arnstein anorthosite bodies, and samples have been collected for analysis.

Several pegmatite bodies have been mapped and sampled in Conger and McDougall Townships. Some are former minor producers of mica, potash, feldspar, and quartz. Three contain radioactive minerals, including allanite crystals up to 15 cm long. Future work will attempt to establish the geological controls of pegmatite occurrences, and determine the distribution and potential of economic mineral phases.

Marble pits in Hagerman and Spence Townships, which have been tested in the past for their calcite content, were mapped in detail and sampled. Several other minor occurrences were sampled. All of the marble examined to date is a tectonite consisting of coarse-grained calcite, with lesser dolomite, containing disseminated silicate minerals and large inclusions of various country rocks. Further work will be directed toward mapping the distribution of the marble units and determining areas which contain relatively pure carbonate, and whether such material can be readily beneficiated to a desirable product.

A preliminary evaluation was begun of potential dimension stone prospects, previously defined by Verschuren *et al.* 1986). The Powassan Batholith was examined; several late metagabbroic intrusions were visited and sampled.

GRAPHITE PROJECT

The Graphite Project in the Central Gneiss Belt, completed this year, will be published as an Open File Report in the near future. Initially part of a more general industrial minerals survey, the inventory for graphite evolved into a full scale project as research and exploration indicated a need for a systematic study. The first year was spent completing a general inventory of graphite occurrences, and delineating specific areas to map in more detail. The second and third summers were allocated to the mapping and sampling of graphite occurrences in Laurier, Ryerson, Butt, and Maria Townships. A petrographic analysis was undertaken of the graphite occurrences in Butt and Laurier Townships. Graphite separates were retrieved by floatation of the ground and sieved sample; these separates were run through a magnetic separator to remove biotite. Neutron activation analysis of graphite separates from the Maria and Butt Townships occurrences yielded rare earth element data. Carbon isotopes were obtained on a sample from each of the Butt and Maria Townships occurrences by the Environmental Isotope Laboratory, University of Waterloo.

As well as the geological aspects of the project, the market end of the graphite industry was examined, aided by a visit to the Vesuvius Crucible plant in Pittsburgh, Pennsylvania. Several companies have been interested in the graphite occurrences highlighted in this study, two of which are at advanced stages of exploration. Since the property in Butt Township was cleared and stripped in late 1986, it provided an excellent exposure of the graphite zone. A detailed map and structural study will be done in the Summer of 1987, and published separately.

COMPUTERIZATION OF MINERAL AND GEOLOGICAL DATA

This project is nearly complete. Data entry commenced in September and will continue through the Winter of 1987. It is anticipated that a significant amount of data will be in the system by the Spring of 1987. This program will allow for more efficient data retrieval and will be available to all sectors of the exploration community.

OTHER GEOLOGICAL ACTIVITIES

LESLIE M. FROST NATURAL RESOURCES CENTRE

R. Keevil, acting Land and Minerals Specialist at the Centre, reported over 5000 user-day opportunities in the minerals program during 1986. A project to evaluate the lapidary stone potential of the area continued and the results of this inventory are available for viewing at the Centre. A detailed evaluation of the "Ranger" peat deposit was carried out during the summer, following the previous year's reconnaissance peatlands/wetlands inventory of the Frost Centre.

The Centre also helped in the preparation of rock samples for projects carried out by the Resident Geologist's office.

ONTARIO GEOLOGICAL SURVEY

Four geological field parties were active in the area, three of which were funded under COMDA.

Mike Easton of the Precambrian Geology Section continued detailed (1:15 840 scale) geological mapping in the Minden area. Parts of Anson, Digby, Hindon, Longford, Lutterworth, Minden, and Oakley Townships were mapped (Easton 1986).

Ted Bright of the Precambrian Geology Section, carried out detailed (1:15 840 scale) geological mapping in the Whitestone Lake area, northeast of Parry Sound. Parts of Croft, Ferrie, Hagerman, and McKenzie Townships were covered (Bright 1986). This COMDA project is in the first year of a three-year program.

Phil Kor of the Engineering and Terrain Geology Section initiated a three-year, detailed Quaternary mapping project in the Parry Sound area. The Lake Joseph, Sans Souci, and Parry Sound NTS sheets were mapped (Kor 1986). Funding for this project was provided through COMDA.

Greg Jones and Mary Gauvreau of the Aggregate Assessment office undertook an aggregate assessment of 13 townships in Haliburton County (Jones *et al.* 1986), to delineate and determine the quality and quantity of aggregate within the area for use in road building and general construction. This was also funded by COMDA.

EXPLORATION ACTIVITY

As of December 10, 1986, a total of 244 claims were recorded in the the Algonquin Region, a noticeable increase from the 123 recorded in 1985 and the 20 recorded in 1984.

Exploration activity related to interests in graphite, silica, building stone, gold, base metals, precious metals, gemstones, rare earths, and platinum, as shown in Figure 11.1 and Tables 11.1 and 11.2.

One of the major hindrances to exploration in the Resident Geologist's area has been a lack of current geological data in a region of complex geology. Substantial improvements to the geological database should be evident over the next three years, as a result of the COMDA program.

GRAPHITE PROJECT

Four graphite occurrences in the Central Gneiss Belt are currently being explored by Princeton Resources Corporation in Maria Township; Graphite Corporation of Canada in Ryerson Township; and Cal Graphite Corporation, and Swayze Resources Limited in Butt Township.

Princeton Resources Corporation, a Vancouver based company, holds 48 claims in Maria Township, near the community of Bissett Creek on Highway 17. The exploration program, started in 1984 with mapping and diamond drilling, has continued to the prefeasibility stage, including construction of a pilot mill. To date, approximately 19 000 feet (5790 m) of drilling has been completed, and plans are to commence drilling again in January 1987. Proven and probable reserves of ten million tonnes of 3 weight percent graphite have been outlined. The property has been optioned to Northcoast Industries Limited, who are continuing to stockpile bulk samples and are planning to run the pilot mill in January. Northcoast plans to complete a feasibility study by mid-1987.

By 1985, Graphite Corporation of Canada acquired the mineral rights to the Murray Watts Graphite Property in Ryerson Township through the purchase of three 100 acre lots approximately 6 km west of

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 11.1

Number on Figure	Individual or Company	Activity
1.	Princeton Resources	Erection of pilot mill, Maria Township
2.	Cal-Graphite Corp.	Diamond drilling, stripping, feasibility study, Butt Township
3.	Jones, E.T.	Trenching, diamond drilling, prospecting, Lount Township
4.	Canadian Gold Resources	Diamond drilling, geophysics, Finlayson Township
5.	Rose, Ed.	Quarry permit, Murchison Township
6.	Irving, W.	Trenching, Stephenson Township
7.	Raretech Minerals Inc.	Diamond drilling, Area of Lower French River

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 11.2

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Muskoka Dist. Finlayson Township	31E/7	Canadian Gold Resources	Gold	Assess	DDH (2-906')	Mar./86	86-83	Finlayson 1
Nipissing Dist. Butt Township	31E/11	Cal-Graphite Corp.	Graphite	Assess	DDH (9-2,961')	1985	86-17	Butt 22
Nipissing Dist. Butt Township	31E/11	Cal-Graphite Corp.	Graphite	Feasibility Report		1986		
Parry Sound Dist. Area of Lower French River	41H/15E	Raretech Minerals Inc.	Rare Earths	Assess	DDH (24-2,690')	Apr./86	86-73	Area of Lower - French River 1
Parry Sound Dist. Laurier Township	31E/4	E.J. Rantala	-	Assess .	STr. and Tr.	Nov./86	86-101	Laurier 13
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Graphite	Assess	Tr.	Apr./86	86-53	Lount 16
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Graphite	Assess	Tr.	1986	86-97	Lount 17
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Graphite, Gold	Assess	Tr.	1986	86-98	Lount 18
Parry Sound Dist. Ryerson Township	31E/12	Ryerson Graphite Project	Graphite	Summary Report	DDH (10-3,644')	1983		
Victoria County Dalton Township	31D/14	R.N. Cloughley	-	Assess	DDH (1-151')	July/86	86-61	Dalton 7

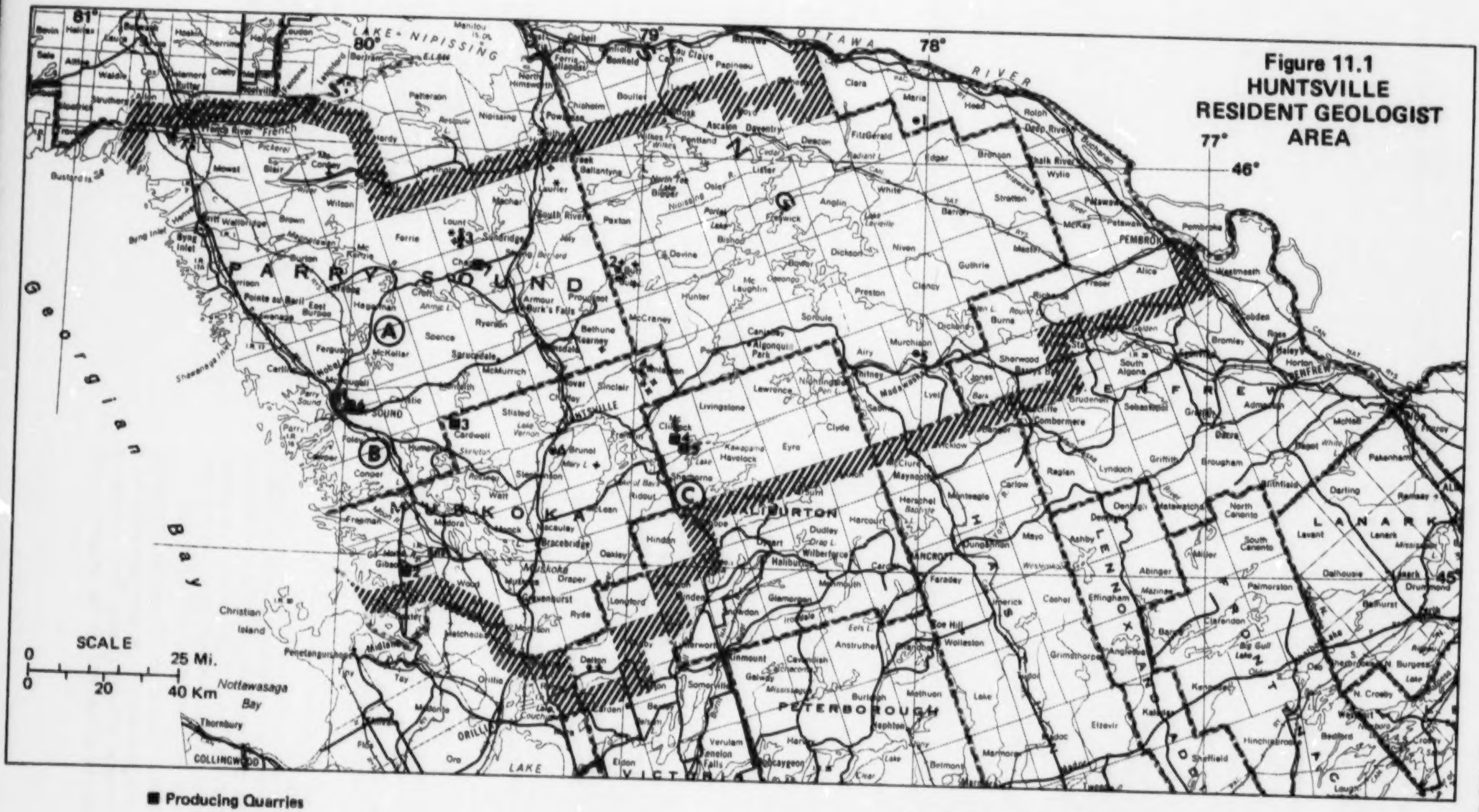
81°
80°
79°
78°
77°
46°
45°
LAKE NIPISSING
OTTAWA RIVER
PARRY SOUND
MUSKOKA
HALIBURTON
PETERBOROUGH
VICTORIA
RENFREW
LENNOX AND ADDINGTON
FRONTENAC
LANARK
HASTINGS
NIPISSING
Georgian Bay
Nottawasaga Bay
Christian Island
PEMBROKE
HUNTSVILLE
BANCROFT
ORILLIA
COLLINGWOOD
LAKE
A
B
C
SCALE
0
20
25 Mi.
40 Km

Figure 11.1
HUNTSVILLE
RESIDENT GEOLOGIST
AREA

■ Producing Quarries

1. Mill Lake Quarry . . . . building stone
2. M.T.C. . . . . construction aggregate
3. Cardwell Twp.. . . . . building stone
4. L. Lock . . . . building stone
5. O. Geldschus . . . . building stone
6. Fowler Construction . . . . construction aggregate
7. Jim Donald . . . . .amazonite

* Assessment Work Filed, 1986 keyed to TABLE 11.2

• Exploration Activity, 1986 keyed to TABLE 11.1

✚ Claim Staking, 1986

▨ Boundary of Resident Geologist's Area

Ⓐ Location of OGS field party, 1986

- A. E. G. Bright
- B. P. Kor
- C. G. R. Jones and M. Gauvreau

Burk's Falls. At the time of acquisition, 1806 feet (550 m) of drilling totaling eight holes, had outlined the graphitic horizon. Graphite Corporation of Canada conducted a self potential survey, and drilled 12 more holes totaling 13 200 feet (4023 m).

In the Fall of 1986, Cal Graphite Corporation released a feasibility study on its 23-claim graphite property in Butt Township, 25 km east of the Town of Kearney. To date 56 holes have been drilled for a total of 21 209 feet (6465 m), and work on bulk samples has been carried out at Lakefield Research and the company's laboratory in Sudbury. The study indicates proven and probable reserves totaling 29.5 million tons grading approximately 2.4 weight percent graphite. If a production decision is made, the initial mining would consist of an open pit operation, with the option to drain two small lakes as required, and a final underground phase. The northeastern extension of the Cal Graphite graphite horizon was staked in 1986 by Swayze Resources Limited and a prospector from Kearney. Swayze staked three claims adjoining onto the eastern edge of the Cal Graphite block, and the prospector staked 14 claims adjoining the northern claim of Swayze Resources and extending to the boundary of Algonquin Park. Exploration work to date has consisted of prospecting, trenching, and sampling on both properties.

RARE EARTH ELEMENTS

A property in the northwestern part of the region that was staked in 1985 has undergone a diamond drilling program. Results of this drilling should be available early in 1987.

GOLD

Limited exploration for gold, mainly by local prospectors, continued in the Huntsville-Parry Sound area. A property in Finlayson and Sinclair Townships (30 km northeast of Huntsville) was staked by Canadian Gold Resources Incorporated late in 1985. A geophysical survey outlined a conductor in the centre of a north-trending lake, also, two diamond-drill holes were drilled from the lakeshore. Additional work is planned for the Winter of 1987.

STONE

Some interest in building stone was shown in 1986. Inquiries concentrated on potential sources of red or black "granite" suitable for interior or exterior facing. There was also some interest expressed in flagstone, as there are several producing quarries within the area.

MINING ACTIVITY

Numerous quarries, most notably the Mill Lake Quarry at Parry Sound, produced flagstone for use primarily as a building stone. The Mill Lake Quarry produces several products, including a very attractive 1/2 inch flagstone, that is easily installed on interior walls.

An amazonite quarry in Chapman Township, northeast of Magnetawan, continued operation as a commercial mineral collecting site. There is also a substantial deposit of garnets on the property which the owner opened up in 1986 as a mineral collecting site. Tourists are transported to the quarry by a horse and wagon.

MINERAL EDUCATION PROGRAM

During the year, regional geological staff visited three Provincial Parks: Killbear (2 visits), Grundy (2 visits), and Arrowhead, to give an introductory talk on minerals and geology, followed by a field trip within the park. Two sessions for the public were given at the Leslie M. Frost Natural Resources Centre during the Summer of 1986. A session on gold panning drew over 200 people.

RECOMMENDATIONS

As a direct result of the Canada-Ontario Mineral Development Agreement, the database for parts of the Central Gneiss Belt will be significantly increased. This work should be monitored for results that could give a better understanding of the potential for selected industrial minerals and rare earths.

Mary Garland will initiate a new project to evaluate the platinum group element potential of the area. Work on this project should be monitored over the next two years.

It is felt that this area, in general, has good to unknown potential for selected industrial minerals, platinum group elements, and precious metals and as mentioned previously, people interested in this area should continually monitor the work being conducted in the Resident Geologist's office.

REFERENCES

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1986: Anson Area, Haliburton and Victoria Counties, and Muskoka District; p.136-139 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p. Accompanied by 1 chart.

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Verschuren, C.P., Papertzian, V.C., Kingston, P.W., and Villard, D.J.
1986: Reconnaissance Survey of Building Stones of Eastern and Central Ontario; Ontario Geological Survey, Open File Report 5585, 302p., 4 figures, 2 tables, 147 photographs, and 1 map.

RECENT PUBLICATIONS

Davidson, A., and Grant, S.M.
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1986: Geochronology of Ontario, Part 1: Compilation of Data; Open File Report 5592, Ontario Geological Survey, 179p., 4 figures, and 1 table.

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1986: Industrial Minerals and Rare Earth Element Deposits in the Muskoka-Parry Sound-Nipissing Area; p.190-192 *in* Summary of Field Work and Other Activities 1986, by the Ontario Geological Survey, edited by P.C. Thurston, Owen L. White, R.B. Barlow, M.E. Cherry, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 132, 435p. Accompanied by 1 chart.

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12. Bancroft Resident Geologist Area, Algonquin Region

Hans D. Meyn

Resident Geologist, Ontario Ministry of Northern Development and Mines, Bancroft.

INTRODUCTION

The Bancroft Resident Geologist Office is responsible for the Minden, Bancroft, and Pembroke Districts of the Algonquin Region of the Ontario Ministry of Natural Resources. The other three districts of the Algonquin Region, Parry Sound, Bracebridge, and Algonquin Park, are the responsibility of D.J. Villard, Resident Geologist, Huntsville.

On April 1, 1986, the Resident Geologist positions in Southern Ontario were transfered to the Southeastern Region of the Ministry of Northern Development and Mines. For the purpose of this report the boundaries between the Resident Geologist's areas are the same as last year (Figure 12.1). Anticipated organizational adjustments are expected to result in boundary changes for next year's report.

The Bancroft office is staffed by Hans D. Meyn, Resident Geologist, W.T. (Bill) Grant, Drill Core Library Geologist, and Karen Fell, secretary.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist devoted some time to familiarization with the geology and mineral deposits of the area. New properties undergoing exploration were visited in the company of the owner or operator. The operating mines were also visited.

The Resident Geologist led two field trips and participated in several others given by persons doing geological work in the area, either for the provincial or federal governments or a university.

Mineral collecting (rockhounding) is an important part of the economy of the Bancroft area and the Resident Geologist was involved with the Chamber of Commerce in supporting mineral collecting in the Bancroft area. As part of that effort, the Ontario Ministry of Northern Development and Mines, again this year, sponsored a booth at the Bancroft Gemboree and the Wilberforce Rockhound Fair, at which mineral and geologically oriented publications issued by the Ministry were on sale. As in previous years, we again sponsored D.H. Gorman, Professor of Mineralogy, University of Toronto, at these two events to identify rocks and minerals for the rockhounds.

DRILL CORE LIBRARY

The Drill Core Library in Bancroft was opened in the Spring of 1984. During the Summer of 1986 the library was kept open to the public by P. Flagler. W.T. Grant, the new drill core library geologist, started October 14th. Until November, 1986, about 42 000 m of core were collected and filed in the new facility. Another 10 000 m are stored outside awaiting processing. The core now in the library represents 542 drillholes from 23 properties in 16 townships representing copper-nickel-cobalt, iron, zinc, uranium, graphite, nepheline syenite, and quartz mineralization.

Data pertaining to the drill core is stored on a microcomputer. This information includes the company name, company drillhole number, year of completion, township, drillhole length, amount of core stored, and whether assays, chemical analyses, thin sections, or polished sections are available. A number of search programs have been written to manipulate the data, thus making it possible to list all drillholes from a specific area by company name or other criteria.

As the drill core library is situated in the Ontario Ministry of Natural Resources compound at Bancroft, about 100 m from the Resident Geologist Office, complete assessment files are kept in the drill core library building. Eventually the documents in the assessment files will be marked to indicate what core or samples are available in the drill core library and how they relate to the assessment files.

OTHER GEOLOGICAL ACTIVITY

SOUTHEASTERN REGION, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Both Resident Geologists in adjacent areas (Huntsville and Tweed) are supervising several COMDA (Canada-Ontario Mineral Development Agreement) projects. Some of these projects extend into the Bancroft area. They will be reported on by the appropriate Resident Geologist in their annual reports.

ONTARIO GEOLOGICAL SURVEY

Maps and reports pertaining to the Bancroft Resident Geologist's area, issued by the Ontario Geological Survey, are shown in Figure 12.1 and listed in Table 12.1. Additional references to new information of geological interest in the general area are included in the list of selected references. Also shown in Figure 12.1 is the location of 1986 field work by the Ontario Geological Survey.

A field party under the leadership of R.M. Easton completed detailed mapping (1:15 840 scale) in the Minden area with the Anson sheet (Easton 1986e, 1986f).

Easton also devoted some of his time to a study of the Apsley Formation in the Apsley area (Easton 1986g).

An aggregate resources inventory of parts of Haliburton County was undertaken by G. Jones, M. Gauvreau, and S. Szoke (Jones *et al.* 1986a, 1986b).

As part of an overall study of the limestone resources of Ontario M.A. Vos investigated the Precambrian limestone resources of Ontario (Vos 1986).

This area was also covered by a building stone survey undertaken by C.P. Verschuren (Verschuren 1986, Verschuren *et al.* 1986) and a refractory minerals survey undertaken by A. Mackinnon (Mackinnon 1986a).

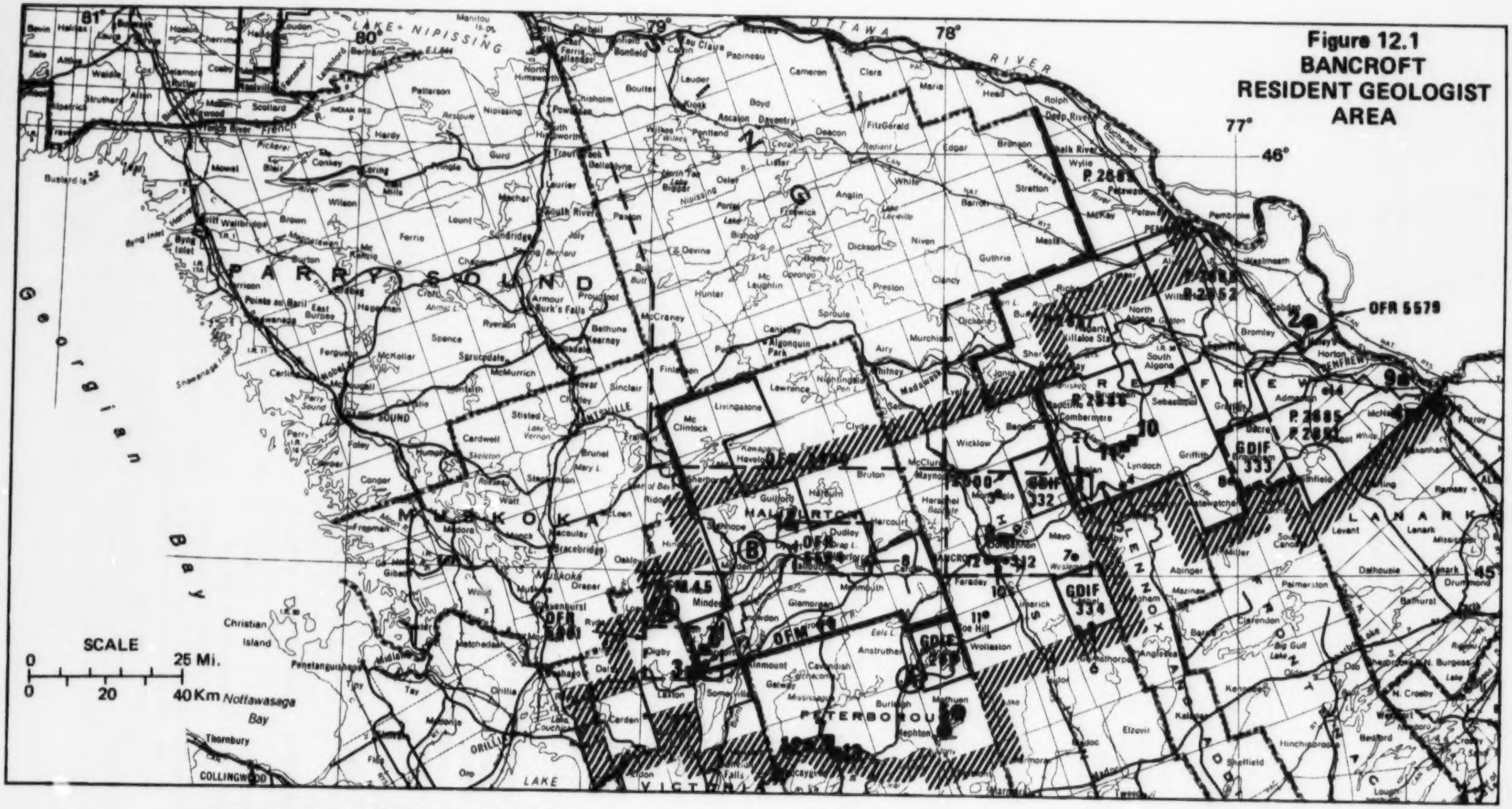

Figure 12.1
BANCROFT
RESIDENT GEOLOGIST
AREA

81°
80°
79°
78°
77°
46°
45°
LAKE NIPISSING
OTTAWA RIVER
PARRY SOUND
NIPISSING
MUSKOKA
HALIBURTON
RENFREW
LENNOX AND ADDINGTON
LANARK
PETERBOROUGH
VICTORIA
Georgian Bay
Nottawasaga Bay
Christian Island
LAKE
OFR 5579
P.2869
P.2852
P.2848
P.2885
P.2886
GDIF 333
GDIF 332
GDIF 334
OFR 5590
OFR 5591
OFM 45
Algonquin Park
SCALE
0
25 Mi.
0
20
40 Km

- Exploration Activity, 1986 (keyed to TABLE 12.2)
- ☐ Map or Report issued by the Ontario Geological Survey in 1986 (keyed to TABLE 12.1)
- ▨ Boundary Of Resident Geologist's Area
- ● Producing Mines
  - 2. Chromasco, a division of Timminco Ltd. . . . . .Mg, Ca, Sr
  - 5. Indusmin, Division of Falconbridge Ltd. . . . . nepheline syenite

Location of OGS Field Parties, 1986

- Ⓐ Precambrian Mapping. . . . . .R. M. Easton
- Ⓑ Aggregate Assessment . . . . .G. R. Jones et al.

■ Producing Quarries

1. Bolender's Ltd.. . . . . crushed dolomite
3. Central Ontario Natural Stone . . . . flagstone
4. Hoffman Concrete Products Ltd. . . . . .crushed stone
6. MacDonald . . . . flagstone
7. Ormell Sand and Gravel. . . . . flagstone
8. Princess Sodalite Mine. . . . . .mineral specimens
9. Smith Construction Ltd. . . . . .crushed stone
10. Wal-Gem Lapidary. . . . . mineral specimens
11. Wal-Gem Lapidary. . . . . rose quartz
12. Windover, N. . . . . .flagstone
13. Windover, N. . . . . .flagstone

TABLE 12.1: MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports		
OFR 5470	Ontario Mineral Deposit Inventory (1986 Edition)	- OGS, 1986i
OFR 5570	Rock Chemical Data Catalogue	- OGS, 1986j
OFR 5572	Peat Analysis	- Riley
OFR 5579	Renfrew Co. Aggregate	- MNR
OFR 5585	Building Stone	- Verschuren *et al.*
OFR 5592	Geochronology	- Easton, 1986a
OFR 5594	Drag Lake Area	- Culshaw
OFR 5600	Algonquin Park Quaternary	- Ford & Geddes
OFR 5601	Digby-Lutterworth Area	- Easton, 1986d
OFR 5616	Source Rock Geochem. - Moraine	- Brand & Terasmae
Open File Maps		
OFM 45	Anson Area	- Easton, 1986e,f
OFM 70	Haliburton Co. Aggregate	- Jones *et al.*
Preliminary Maps - Precambrian Series		
P.2840	Geochronology	- Easton, 1986b
P.2841	Geochronology	- Easton, 1986c
Preliminary Maps - Mineral Deposit Series		
P.2685	Sand & Gravel Assess. Renfrew Co.	-Trotter *et al.*
P.2686	Sand & Gravel Assess. Renfrew Co.	-Trotter *et al.*
P.2687	Sand & Gravel Assess. Renfrew Co.	-Trotter *et al.*
P.2688	Sand & Gravel Assess. Renfrew Co.	-Trotter *et al.*
P.2689	Sand & Gravel Assess. Renfrew Co.	-Trotter *et al.*
P.2690	Sand & Gravel Assess. Renfrew Co.	-Trotter *et al.*
Preliminary Maps - Bedrock Topography Series		
P.2851	Bedrock Aggregate Assess. Renfrew Co.	- Trotter, 1986a
P.2852	Bedrock Aggregate Assess. Renfrew Co.	- Trotter, 1986b
Coloured Maps		
2500	Bancroft Quaternary	- Barnett
Geological Data Inventory Folios		
GDIF 280	Chandos Township	- OGS, 1986f
GDIF 332	Charlow Township	- OGS, 1986d
GDIF 333	Brougham Township	- OGS, 1986g
GDIF 334	Cashel Township	- OGS, 1986e
Miscellaneous Papers		
MP 77	Index to Published Reports and Maps, 1985 Supplement	- OGS, 1986b
MP 132	Summary of Field Work and Other Activities, 1986	- OGS, 1986
Mineral Resources Branch Publications		
Video Census Series No. 5		
	Mineral Statistics	- Weatherson
Miscellaneous Publications		
	Rocks and Minerals Information 1986	- OGS, 1986a
	Publications Price List	- OGS, 1986h

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 12.2

Number on Figure	Individual or Company	Activity
1	Arengi, J.T.	Claim Staking (4), Raglan Twp.
2	Bryan, J.A.	Claim Staking (4), Raglan Twp.
3	Canadian Crystal Spa Corporation	Stripping, Trenching, Sampling, Monteagle Twp.
4	Crawford, R.J.	Claim Staking (1), Raglan Twp. " " (2), Lyndoch Twp.
5	DiGirolamo, M.	Drilling, Sampling, Mapping, Dungannon Twp.
6	Dingman, M.A.	Claim Staking (2), Cashel Twp.
7	Dubblestein, A.	Claim Staking (3), Mayo Twp. Drilling, Trenching, Bulk Sampling
8	Ekstrom, R.L.V.	Claim Staking (10), Monmouth Twp. " " (4), Griffith Twp.
9	Jayfran Enterprises Limited	Sampling, Dungannon Twp.
10	Kretschmar, U.	Claim Staking (2), Dungannon Twp.
11	Labonte, S.	Claim Staking (2), Wollaston Twp.
12	Menard, A.C.	Claim Staking (2), Dungannon Twp. " " (1), Faraday Twp.
13	Northgate Exploration Limited	Line Cutting, Soil Geochemistry, Lutterworth Twp.
14	Novamin Resources Inc.	Drilling, Rock Geochemistry, Admaston Twp.
15	Palladini, J.	Claim Staking (6), Raglan Twp. Sampling

GEOLOGICAL SURVEY OF CANADA

A.P. Stenson is continuing her study of mineral collecting in Canada. The new guidebook for the Bancroft-Parry Sound and Southern Ontario area was released in the Fall of 1986 (Sabina 1986).

A. Davidson and associates are continuing with the regional synthesis of the Grenville Province in Ontario and Quebec (Davidson and Grant 1986).

S. Hanmer is continuing his studies of structural boundaries in the Grenville Province of Ontario and Quebec (van Breemen and Hanmer 1986).

Eastern Ontario is included in W.W. Shilts' continuing studies of the properties and provenance of glacial sediments.

C.A. Kaszycki is continuing her studies of glacial erosion of the Canadian Shield in the Haliburton area.

ROYAL ONTARIO MUSEUM

S.B. Lumbers continued his studies of the Grenville Province. The most recent work is the synthesis of the Central Metasedimentary Belt, concentrating on the area southwest and south of Bancroft.

UNIVERSITIES

R. Thivierge, University of Ottawa, is completing an M.Sc. thesis on the Centreville-Combermere area.

Steve Dunn, University of Wisconsin, is continuing a Ph.D. study of stable isotopes of some of the gabbroic bodies of the Bancroft area.

Several Canadian and American universities have annual field trips to the Bancroft area. These are generally at the undergraduate level. The University of Windsor holds their annual field camp just south of Bancroft, and the University of Ottawa holds theirs in the Calabogie area.

EXPLORATION ACTIVITY

The location of properties which were staked and those on which exploration work is known to have been done in 1986 are listed in Table 12.2 and shown in Figure 12.1, keyed to Table 12.2. Assessment work reports received in this office are listed in Table 12.3.

Novamin Resources Incorporated, having bought the assets of Sulpetro Minerals Limited, is continuing with exploration at the Renprior/Cadieux Zinc Property in Admaston Township. Diamond drilling early in the year was followed by a bedrock sampling program which led to the discovery of a new zone in the eastern end of the property. Currently close to 1 million tons grading 10.6 percent zinc, and 0.8 percent lead have been outlined on the property. Management considers that a minimum of 1.2 million tons of such material is necessary to justify mine development. Drilling is currently continuing in order to try to "prove up" the additional reserves needed.

Northgate Exploration Limited is carrying on with base-metal exploration in Lutterworth Township. The property consists of 22 claims on which line cutting, geological mapping, and soil geochemistry was done in 1986.

Some work was done in Mayo, Cashel, Burleigh, Dungannon, Faraday, and Griffith Townships on marble deposits for use as either building stone or mineral filler.

Two groups of claims were staked around the southern margin of the Raglan Gabbro, Raglan Township, to examine its platinum group metals potential.

TABLE 12.3 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

Abbreviations Used:

DD	- Diamond Drilling (where shown, the numbers following "D" indicate the number of holes drilled and the total length drilled respectively)	Expend	- Expenditures
		Psack	- Packsack Drilling
		Mech	- Mechanical
		STr	- Stripping
Geochem	- Geochemical Survey	Tr	- Trenching
Geophys	- Geophysical Survey	SA	- Sampling, Assaying
GL	- Geological Survey	ra	- Radioactive
Rad	- Radiometric Survey	REE	- Rare Earth Elements

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Haliburton Co. Lutterworth Twp.	31D/15	Francis T. Manns	Lead Zinc	GL Geochem	Mapping Linecutting Soil Sampling	1985	2.8866	Lutterworth 7
Haliburton Co. Monmouth Twp.	31D/16	D.A. MacFadyen	Mineral Spcmns.	Manual Mech	Tr, Sampling Power STr	1985	-	Monmouth 115
Hastings Co. Cashel Twp.	31C/13	Canadian Shield Stone Products Ltd.	Building Stone	GL	Mapping Evaluation	1985	2.9111	Cashel 7
Hastings Co. Dungannon Twp.	31F/4	Jayfran Enterprises Ltd.	Nepheline Syenite Uranium	GL Geophys	Mapping, SA Rad	1983	63.4322 OM83-9-C-131	Dungannon 23
Hastings Co. Dungannon Twp.	31F/4	Pipawa Explorations Ltd.	Nepheline Syenite Uranium	GL Geophys Mech Manual	Mapping Rad Sampling STr	1985	2.8790	Dungannon 24
Hastings Co. Dungannon Twp.	31F/4	Jayfran Enterprises Ltd.	Nepheline Syenite Uranium	Drill Log	DD(11-1200')	1984	63.4429 OM84-9-C-205	Dungannon 25
Hastings Co. Faraday Twp.	31F/4	M. DiGirolamo	Marble	GL	Mapping	1984	2.8667	Faraday 79
Hastings Co. Mayo Twp.	31F/4	Allen Dubblestein	Calcium Carbonate	Mech Manual Expend	Psack Drilling Power STr Pits Assays	1985	2.8864	Mayo 9
Hastings Co. Mayo Twp.	31F/4	Allen Dubblestein	Calcium Carbonate	Mech Manual	Psack Drilling Power STr Pits	1986	-	Mayo 10
Hastings Co. Monteagle Twp.	31F/4	Canadian Crystal Spa Corporation	ra minerals	Manual	STr	1986	-	Monteagle 19
Hastings Co. Monteagle Twp.	31F/4	Canadian Crystal Spa Corporation	ra minerals REE	Geochem	Linecutting Humus Sampling	1985	2.9049	Monteagle 20
Peterborough Co. Burleigh Twp.	31D/9	James Leon Byer	Calcium Carbonate	Drill Log	DD(1-200')	1985	-	S. Burleigh 21
Renfrew Co. Blithfield Twp.	31F/2	Norman Pilatzke	Uranium	Mech	Tr	1985	-	Blithfield 21
Renfrew Co. Griffith Twp.	31F/6	Trisar Resources Ltd.	Mineral Filler Dolomite	Drill Log	DD(1-191')	1985	-	Griffith 8
Victoria Co. Carden Twp.	31D/11	K.J. Beamish Construction Co. Ltd.	?	Mech	Power STr	1985	-	Carden 1

R.J. Crawford is continuing base metal exploration on his claims in southwestern Lyndoch Township. Considerable vermiculite was discovered in the course of this work.

Jayfran Enterprises Limited expanded their holdings of nepheline syenite in Dungannon Township and did mapping and sampling there in 1986.

R.N. Cloughley expanded his holdings in Dalton Township where he is doing precious metal exploration.

R.L.V. Ekstrom staked the Spain Mine, a former molybdenum producer, in Griffith Township.

A. Dubblestein increased his holdings in Mayo Township where he has done considerable bulldozing, trenching, and drilling on a marble deposit suitable for filler applications. A bulk sample was removed and sent for testing to Canada Talc Industries Limited.

Canadian Crystal Spa Corporation continued with stripping, trenching, and sampling at the MacDonald Mine Property, Monteagle Township, in search of radioactive minerals.

MINING ACTIVITY

The locations of the operating mines and quarries are shown in Figure 12.1.

Indusmin, a Division of Falconbridge Limited, produces nepheline syenite in Methuen Township from the Mather Ridge and the Blue Mountain open pits. The mined material is processed in plants at Nephton and Blue Mountain. Both plants produce a wide range of products for the glass, ceramic, fibreglass, and filler industries. In 1986 sales are expected to be

464 000 tonnes. About 165 people are employed at the two sites.

Chromasco, a division of Timminco Limited, near Haley Station, Ross Township, employs about 450 people and operated at capacity in 1986. The company produced, in its reduction plant, magnesium metal from 120 000 tons of dolomite mined in 2 pits on the property. Because of steep ramps, production from No. 1 Pit is confined to the summer. Process changes planned for the near future are expected to raise magnesium production capacity by 25 percent. Based on demand, high purity calcium and strontium metal is also produced, but from material purchased off site. The company plans to move the strontium and calcium production facilities to a new plant near Westmeath, Ontario during 1987. The company is continuing exploration and mineral processing research at its Cape Breton celestite prospect.

Crushed stone for aggregate is produced from two quarries in McNab Township. Crushed stone for aggregate, tile beds, and gabions, as well as flagstone, and edging stone, is produced from four quarries in Harvey Township. Flagstone is also produced from the MacDonald Quarry in Lutterworth Township.

White dolomite is produced at the quarry of Bolender's Limited, Guilford Township, for poultry grit, golf sand, exposed concrete facing, and white bricks and mortar.

Chips of rose quartz, granite, feldspar, and white quartz are produced on demand from the West Quarry of Wal-Gem Lapidary in Lyndoch Township.

Mineral specimens are produced from both the East and West Quarries of Wal-Gem Lapidary. Sodalite for the lapidary trade and mineral collectors is produced on a demand basis at the Princess Sodalite Mine, Dungannon Township, just east of Bancroft.

RECOMMENDATIONS

The Bancroft area is close to the markets of Ontario, Quebec, and the northeastern United States. Adequate road, rail, and water transportation routes exist, good access is normal, and an adequate labour pool, and other features of a stable, well-developed infrastructure are in place. A deposit of adequate size and consistent grade should be able to compete in these markets.

Potential exists in the area for graphite, talc, high purity calcium, high purity silica, and building stone. Mica as filler is still somewhat of a new industry, but the potential market is seen to be excellent. North American markets also exist for coarse "book" mica (muscovite or phlogopite) which, in the past, has been produced locally from pegmatite deposits.

In Ontario, Quebec, and New York State, several mines have operated, or are still operating, based on sphalerite associated with carbonate metasediments. Potential for such deposits exists through much of Eastern Ontario.

The Minden-Bancroft-Pembroke area has numerous pegmatite occurrences and, in the past, several mines were developed on these pegmatites. Pegmatites containing mica, silica, calcite, potassic feldspar, radioactive minerals, and rare earth element minerals are known to exist. Based on several coproducts, it may be possible to bring one, or several adjacent ones, into production.

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13. Eastern Resident Geologist's Area, Eastern Region

P.W. Kingston[1] and S. van Haaften[2]

[1]Resident Geologist, Ministry of Northern Development and Mines, Tweed.

[2]Resource Geologist, Ministry of Northern Development and Mines, Tweed.

INTRODUCTION

During 1986, exploration for industrial minerals and precious metals was the main activity of mining companies, prospectors, staff of the Resident Geologist's Office, and of the Ontario Geological Survey (OGS). The emphasis was on exploration for gold, granite building stone, wollastonite, and dolomite.

The Resident Geologist became part of the Ministry of Northern Development and Mines (MNDM), Southern Ontario Group, on April 1, 1986. A.E. Pitts is the Regional Manager for Southern Ontario.

The Resident Geologist's Office is staffed by P.W. Kingston, Resident Geologist; L.G.D. Thompson, Geophysicist; S. van Haaften, Resource Geologist; and V.C. Papertzian, Core Library Geologist. C.M. Cassidy is employed on a full-time contract as Mines Clerk, and D.A. Williams, C.P. Verschuren, and A. MacKinnon are full-time contract Geologists for the Canada-Ontario Minerals Development Agreement (COMDA). M.J. Oudejans worked on contract as Geophysics Assistant.

Six students were employed under the Experience '86 program, and one student was hired under the MNDM Internship Program.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist provided a consultative technical service to companies and individuals engaged in mineral exploration and mining development in Southeastern Ontario. This service involved consultations in the office and in the field, and use of the Resident Geologist's library, files, and computer systems. The core library was extensively used by a wide variety of clients.

Selected mineral properties were visited, either because of their importance to Ministry programs, or because of interest in, or work by, mining and exploration companies. Emphasis was placed on carefully examining properties under development, especially industrial mineral properties.

COMDA projects that were carried out from the Resident Geologist's Office were building stone and refractory minerals studies, and part of the Madoc Unconformity Study. Much of the Resident Geologist's time was spent in co-ordination and technical supervision of these projects.

The Tweed Geophysicist completed a number of seismic and radiometric surveys. These surveys supported the MNDM-COMDA Madoc Unconformity Project, and mineral aggregates and sensitive clay studies done by the Ministry of Natural Resources (MNR).

Two special employment programs (SEP), part of the Mining Sector Work Program, were managed in 1986 by the Resident Geologist and his staff. The Crowe Valley Conservation Authority sponsored both projects. The first project ran from February 3 to April 25, employing 6 people for 12 weeks. This project improved Resident Geologist and Core Library data by: a) logging of diamond-drill core from gold deposits; b) doing petrographic descriptions of building stone thin sections; and c) preparing Geological Data Inventory Folios.

The second SEP ran from May 26 to December 19, employing seven people to generate 182 work-weeks of employment. This project provided assistants to accelerate building stone, refractory minerals, and geophysics projects and to allow the completion of work additional to what the Resident Geologist's budget allowed. The project participants, together with summer students, mapped access and physical features of mineral deposits in five townships, and collected, organized, and labeled diamond-drill core. This SEP also allowed the placement of the Tweed assessment files on computer, and the collection of more than 30 blocks of building stone weighing from 300 to 500 pounds (135 to 225 kg) each.

P.W. Kingston and W.F. Caley (Associate Professor, Metallurgical Engineering, Technical University of Nova Scotia, Halifax) completed an investigation of the historical and metallurgical aspects of small scale lead smelting practice in Eastern Ontario during the first decade of this century.

Field trips were held in the Tweed area for Resident Geologist's staff and the Southern Ontario Group manager in July, and for Huntsville, Bancroft, and Tweed Resident Geologists and staff in October. Both field trips focused on Tweed's industrial minerals projects and on current mineral exploration and development by industry. D.A. Williams conducted a two-day field trip of Paleozoic geology near Ottawa for the Geological Association of Canada Annual Meeting in May.

The Resident Geologist or his staff attended the following meetings in 1986:

1. Geological Survey of Canada Open House, Ottawa, January
2. Prospectors and Developers Association Annual Meeting, Toronto, March
3. Geological Association of Canada Annual Meeting, Ottawa, May
4. Gold '86 Meeting, Toronto, September
5. National Industrial Minerals Meeting, Ottawa, October
6. Ontario Geological Survey Open House, Toronto, December

DIAMOND–DRILL CORE LIBRARY by V.C. Papertzian[3]

[3]Diamond-Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Tweed.

The core library was managed by V.C. Papertzian. Michelle Courneyea acted as assistant in June, July, and August as part of the Experience '86 program.

The following resources and services are offered at the Tweed Drill Core Library:

TABLE 13.1: TWEED DIAMOND-DRILL CORE LIBRARY CATALOGUED HOLDINGS, NOVEMBER 26, 1986

Township	Company	Depth Drilled (M)	Core Stored (M)
Anglesea	Ultimate Energy Res.	398.6	256.7
Barrie	Grandad Resources Limited	913.8	894.8
Belmont	Blairton Iron Mine	1 460.4	1 202.4
Belmont	Cordova Gold Mine	2 875.3	2 489.6
Belmont	Pershing Iron Mine	6 712.3	5 718.4
Belmont	Preussag Canada Limited	1 211.9	1 133.7
Camden East	Roblindale Quarry	17.0	16.8
Charlottenville	Oliver Iron Mining Division	5 290.4	1 891.5
Clarendon	Selco Inc.	245.4	232.0
Clarendon	St. Joseph Explorations Ltd.	905.0	905.0
Elzevir	Steep Rock Resources Inc.	516.2	492.0
Ernestown	Bethlehem Steel Corp.	185.9	185.9
Hope	Ontario Hydro	4 453.6	1 822.6
Hungerford	Ram Petroleums Ltd.	162.0	162.0
Kaladar	C.R. Young	153.3	126.9
Kaladar	E & B Explorations Inc.	1 492.1	1 492.1
Kaladar	J. Byer	123.1	121.1
Lanark	Selco Inc	1 610.7	1 514.6
Madoc	Bannockburn Gold Mine	260.6	177.8
Madoc	Freeport Exploration Can.	3 192.6	2 244.3
Madoc	Mono Gold Mines Inc.	11 766.8	11 711.1
Madoc	E. Sager	1 562.3	1 330.1
Madoc	Syngenore Explorations Ltd.	3 438.4	2 388.8
Madoc	Twin Buttes Expl. Inc.	736.0	736.0
Marmora	Ackerman Gold Mines	37.1	37.0
Marmora	Belmar Resources Inc.	374.1	361.0
Marmora	Bethlemhem Steel Corp.	12 787.0	4 081.3
Marmora	Gold Brooke Expl.	795.0	810.9
Methuen	Preussag Canada Ltd.	190.6	175.7
N. Elmsley	Globe Graphite	880.6	670.5
North Burgess	Min. of Natural Resources	51.6	51.6
North Crosby	Min. of Trans. & Comm. Westport DDH	32.0	32.0
OGS	Ont. Geol. Survey/Sir Sanford Flemming College	155.1	149.3
Olden	Lynx-Canada Expl. Ltd.	15 825.8	14 711.5
Ont. Hydro	Ontario Hydro	1 620.4	949.1
Palmerston	Fairfield Projects	152.4	146.8
Ramsay	J.M. Bell	665.4	665.4
Seymour	Allan's Mills	3 530.8	3 170.8
Sommerville	Ont. Geol. Survey/Sir Sanford Flemming College	28.0	28.0
S. Fredricksburg	Lennox Generat. Stn.	107.5	107.5
Tudor	Wolfex Expl. Ltd.	75.8	75.8
Wentworth PQ	Black Gregor Expl.	84.4	83.1
Woodhouse	Oliver Iron Mining Division	1 540.5	509.1
Total		88 637.9	66 062.6

1. drill core from Southern Ontario
2. facilities for logging and splitting core
3. binocular and petrographic microscopes
4. rock cutting and polishing equipment
5. assessment files, building stone files, and mineral deposits files
6. level and section plans from past producing mines in the area
7. geological maps and reports
8. Eastern Ontario mineral deposits and building stone database searches on a microcomputer
9. searches of the Ontario Mineral Deposits Inventory Database.

As of November 21, 1986, 66 062 m of core were in the core library catalogue, and approximately 300 m of recently acquired core had yet to be catalogued. Table 13.1 summarizes the library's holdings. During 1986, 17 246 m of core were catalogued.

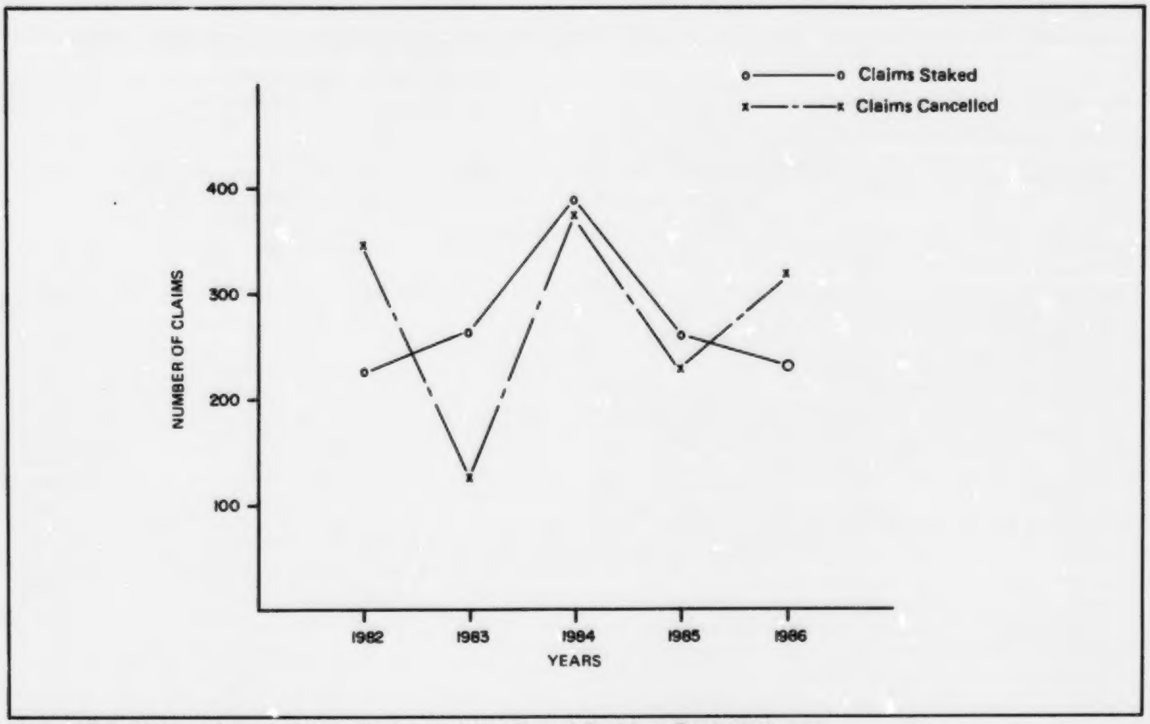


Figure 13.1. Claim staking and cancellation activity, Tweed Resident Geologist's area.

The core library facilities and equipment were used extensively by staff of the Special Employment Programs.

EXPLORATION ACTIVITY

In 1986, approximately 232 new claims were recorded in the Resident Geologist's area. About 317 claims were cancelled, and 15 claims were reinstated. Claim stakings and cancellations for the last five years are summarized in Figure 13.1.

Figure 13.2 shows the locations of claims staked and assessment work which was received during 1986. Table 13.2 summarizes assessment work and other information received by the Resident Geologist's Office.

Much exploration work in Southern Ontario is carried out on private land, and companies are not obligated to report this work to the Ministry. It is therefore impossible to report on all exploration work in the Resident Geologist's area.

Arbor Resources Incorporated optioned the Sophia Mine (Old Diamond Mine) and many surrounding properties near Queensborough in Madoc Township in 1985. Exploration work to date has included more than 9000 feet (2745 m) of diamond-drilling. This mine was worked intermittently from 1900 to 1941, producing 110 ounces of gold, from two gold-bearing quartz veins (Gordon *et al.* 1979). The option also includes the Canada Sulphur Ore Company pyrite mine and the Blakeley Mine, which were explored for base metal mineralization in the 1960s. Gold and silver values were obtained from drill core during the base metal exploration.

Aur Resources Incorporated optioned the Fardom Marble Quarry at Actinolite in Hungerford Township in 1985. In that year the company pumped out this dimension stone quarry, preparing to extract test blocks. No work was reported on this property in 1986.

Belmar Resources Incorporated is exploring for gold in Marmora and Belmont Townships. The company is mainly working on and about the Ackerman Occurrence which in the past has yielded 0.32 ounce gold per ton over a width of 5.6 feet (1.7 m) and a length of 150 feet (45 m) (Gordon *et al.* 1979).

Black Hawk Mining Incorporated (formerly Platinova Resources Limited) is exploring a large wollastonite deposit in Marmora Township. Resident Geologist's staff mapped this deposit in 1986. The mapping is described in this report under wollastonite, and was summarized in the Ontario Geological Survey's Summary of Field Work (MacKinnon 1986b).

The Boerth Gold Prospect, and its immediate area in Clarendon Township, is currently being explored. Previous work on this prospect returned an averaged gold value of 0.67 ounce gold per ton (Gordon *et al.* 1979).

J.L. Byer of Actinolite, Ontario, is actively exploring for industrial minerals and precious metals. Assessment File ELR016 contains drill logs from Mr. Byer's talc property in Elzevir Township.

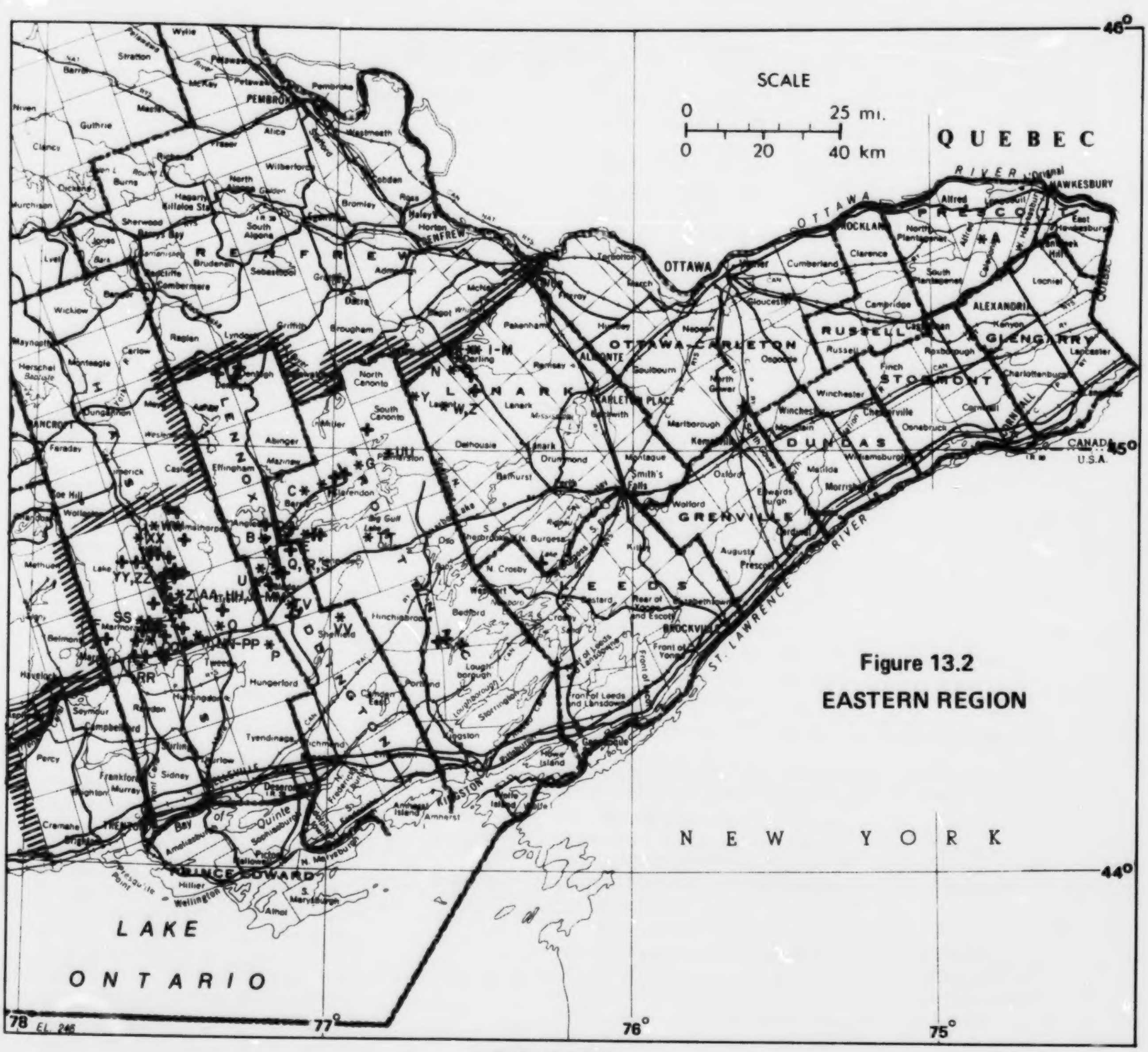

SCALE
0
25 mi.
0
20
40 km
QUEBEC
OTTAWA
RIVER
HAWKESBURY
PRESCOTT
RUSSELL
GLENGARRY
STORMONT
DUNDAS
GRENVILLE
LEEDS
OTTAWA-CARLETON
LANARK
RENFREW
PEMBROKE
RENFREW
BROCKVILLE
KINGSTON
ST. LAWRENCE RIVER
CANADA
U.S.A.
NEW YORK
LAKE ONTARIO
PRINCE EDWARD
Bay of Quinte
46°
45°
44°
78
77°
76°
75°
EL. 246

Figure 13.2
EASTERN REGION

EXPLANATION

** Assessment Work Filed in 1986
(keyed to TABLE 13.2)

+ Claim Staking Activity

▨ Boundary of Resident Geologist's Area

TABLE 13.2 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TWEED RESIDENT'S OFFICE
SYMBOLS AND ABBREVIATIONS

DD - Diamond Drilling (where shown, the number following "DD" indicates the number of holes drilled and the total length drilled respectively)
EM - Electromagnetic Survey
Geochem - Geochemical Survey
GL - Geological Survey or Report
Mag - Magnetometer Survey
Power STr - Power Stripping
SA - Sampling, Assaying
SP - Self Potential
Tr - Trenching
VLF - Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Alfred & Caledonia	31G/10SW	Bird & Hale Ltd.	Peat	Non Assess	Evaluation	1984	63.4497	ALD001
Anglesea	31C/14SE	S.J. Bartlett	Au	Assess	Em,Mag,SP	1984		AHA009
Barrie	31C/14NE	D.A. Hardie	Au	Non Assess	DD3-304'	1983		BAE072
Barrie	31C/14SE	S.J. Bartlett	Au	Assess	GL	1986	2.9391	BAE073
Barrie	31C/14SE	S.J. Bartlett		Assess	EM	1984		BAE074
Barrie	31C/14SE	Homestake Mineral Development Company	Au	Assess	Geochem	1986		BAE075
Belmont & Marmora	31C/12SW	Belmar Resources Inc.	Au	Assess	Geochem, EM, Mag	1985	2.9068	BET004 MAA033
Clarendon	31C/15NW	Homestake Mineral Development Company		Assess	Geochem	1986		CLN021
Clarendon	31C/14NE	St. Joe Canada Inc.	Au,Ag,Pb, Zn,Cu	Assess	DD1-597'	1985		CLN022
Darling	31F/02NE	Kinbauri Gold Corp.	Au	Assess	Geochem	1985	2.9096	DAG027
Darling	31F/02NE	Lac Minerals Ltd.	Au	Assess	SA			DAG028
Darling	31F/02NE	Lac Minerals Ltd.	Au	Assess	Geochem	1983	2.9067	DAG029
Darling	31F/02NE	Lac Minerals Ltd.	Au	Assess	Geochem			DAG030
Darling	31F/02NE	Lac Minerals Ltd.	Au	Assess	Power STr	1984		DAG031
Darling & Lavant	31F/02NE	Lac Minerals Ltd.	Au	Assess	Geochem,GL,SA	1984	2.9070	DAG032 LAT018
Elzevir	31C/11SW	J.L. Byer	Talc	Assess	DD2-400'	1985		ELR016
Hungerford	31C/11SE	Steep Rock Resources	Mica	Assess	DD2-609'	1986		HUD003
Kaladar	31C/11NE	E & B Explorations	Au	Assess	DD10-6704'	1983	63.4333	KAR033
Kaladar	31C/11NE	Homestake Mineral Development Company	Au	Assess	Geochem	1986		KAR034
Kaladar	31C/11NE	R.C. Longmiur	Au	Assess	DD1-300'	1986		KAR035
Kaladar	31C/11NE	Steep Rock Resources Inc.	Mica	Assess	DD5-55'	1986		KAR036
Kaladar	31C/11NE	R.C. Longmiur	Au	Assess	DD1-184'	1986		KAR037
Kaladar	31C/11NE	Steep Rock Resources Inc.	Mica	Assess	DD3-327'	1986		KAR038
Lavant	31F/02SE	Lac Minerals Ltd.	Au	Assess	SA	1985	2.9015	LAT019
Lavant	31F/02SE	Lac Minerals Ltd.	Au	Assess	DD5-1370.80'	1985		LAT020
Lavant	31F/02SW	Todd Sanders	Cu,Sb,Ag, Mg,Barite	Assess	VLF	1986	2.8984	LAT021
Madoc	31C/12NE	Mono Gold Mines Inc.	Au	Assess	GL,Geochem	1985	2.8920	MAC060
Madoc	31C/12NE	Mono Gold Mines Inc.	Au	Assess	Geochem	1985	2.8962	MAC061
Madoc	31C/11NW	J.L. Byer C.R. Young	Talc	Assess	GL	1985	2.9364	MAC062
Madoc	31C/12SE	Harwin Exploration & Development Inc.	Au	Assess	Power STr	1986		MAC063
Madoc	31C/12NE	Harwin Exploration & Development Inc.	Au	Assess	Power STr	1986		MAC064
Madoc	31C/11SW	A.D. Houston		Assess	Tr	1986		MAC065
Madoc	31C/12SE	A.D. Houston		Assess	Power STr	1986		MAC066

TABLE 13.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Madoc	31C/12SE	A.D. Houston	Au	Assess	Power STr	1985		MAC067
Madoc	31C/12SE	Canadian Shield Stone Products Ltd.	Stone-Marble	Assess	GL	1985		MAC068
Madoc	31C/11SW	F. Scott		Assess	VLF	1985		MAC069
Madoc	31C/12NE	Mono Gold Mines Inc.	Au	Assess	GL,Geochem	1985		MAC070
Madoc	31C/12NE	Mono Gold Mines Inc.	Au	Assess	Geochem	1985	2.9048	MAC071
Madoc	31C/12NE	Mono Gold Mines Inc.	Au	Assess	DD1-400'	1986		MAC072
Madoc	31C/12SE	W.P. Houston	Stone-Marble	Assess	DD1-140.5'	1985		MAC073
Madoc	31C/11SW	A. Sager		Assess	GL,Geochem	1985	2.8954	MAC074
Madoc & Elzevir	31C/11SW	F. Scott Management		Assess	VLF	1985		MAC075 ELR017
Madoc & Elzevir	31C/11SE	Fenton, Scott & W.J. Brown		Assess	VLF	1985	2.9351	MAC076 ELR018
Madoc & Marmora	31C/12SE	M. Dingman	Au	Assess	Assays	1985	2.8837	MAC077 MAA034
Marmora	31C/05NE	Belmar Resources Inc.	Au	Assess	DD1-242'	1985		MAA035
Marmora	31C/12SE	The Bonter Marble Property	Calcite	Non Assess	DD1-300'	1984	63.4500	MAA036
Olden	31C/15SW	D.U. Kretschmar		Assess	GL	1985		OLN043
Palmerston	31C/15NW	Novamin Resources Inc.		Assess	DD3-1,098'	1986		PAN053
Sheffield	31C/10SW	St. Joe Canada Inc.	Pb,Zn	Assess	GL	1985	2.9078	SHD008
Tudor	31C/13SE	R.J. Dillman		Assess	EM,Geochem,SA	1985		TUR026
Tudor	31C/13SE	Nathan Helm	Au,Fe	Assess	Manual Work, Assays,Power STr	1985/86	2.8457	TUR027
Tudor	31C/12NE	R. Pierce	Au,Ag,Cu, Pb,Zn	Assess	DD1-144'	1985		TUR028
Tudor	31C/12NE	R. Pierce	Au,Ag,Pb	Assess	DD1-102'	1936		TUR029

D.M. Collins of Stella, Ontario, applied for quarry permits to extract marl from Lime Lake in Hungerford and Richmond Townships, and Inglesby Lake in Sheffield Township. These applications have generated comment from several Ministries and agencies, and Mr. Collins will need to provide information about topics such as marketability of the marl, proposed extraction techniques and pollution abatement, and effects on the local residents and cottage owners. This information is required because the proposed extraction is in a populated area with brook trout-stocked streams and sensitive natural features.

J.L. Corbell, in association with Karnuk Marble Industries Incorporated, is exploring Eastern Ontario for granite and marble building stone.

G.R. Guillet is exploring the Bonter Marble Calcite Deposit in Marmora Township. A geological report was received this year and placed in the assessment files as local file number MAA036.

Homestake Mineral Development Company is exploring for gold in the Resident Geologist-s area.

W.P. Houston of Stokiosar Marble Quarries Limited is exploring for building stone in Madoc Township. Stokiosar is a producer of marble terrazzo chips.

W. Kennedy staked the former Richardson Feldspar Mine in Bedford Township for high-purity quartz. Mr. Kennedy has conducted an induced polarization survey on the property, successfully outlining an extension to the known dimensions of the quartz body.

Lacana Mining Corporation acquired property in the Marmora Township area and is exploring for gold. The company optioned the Kaladar (Omya) flake muscovite mica Deposit and drilled two diamond-drill holes on the mica in July, 1986.

Mono Gold Mines Incorporated continued exploration of their gold property at Bannockburn in Madoc Township during 1985 and 1986. The following description of their property is quoted from the George Cross News Letter (No.224, November 21, 1986):

> "Mono Gold Mines Inc. has reported 249,940 tons containing 0.446 ounce gold per ton across a 4 foot mining width on the 100% owned Bannockburn 600 acre property located on highway 62 in Madoc Township, approximately 10 miles north of Madoc and 150 miles NE of Toronto, Ontario.
>
> The company is conferring with L.J. Manning, P.Eng., mining engineer with a view to determining the most logical spot for a decline for an underground bulk sample across the ore zones. The field geologists have recommended additional surface work and 22,000 feet of diamond-drilling to fill-in some 400 feet between the "D" and "H" zones and to explore the northernmost part of the "H" zone.

> Since the initial gold discovery was made in November, 1984 the company has completed $1,500,000 of exploration including in excess of 30,000 feet of diamond-drilling in 100 holes over a strike length of 850 feet to an average depth of 350 feet.
>
> ...At Bannockburn, a major volcanic-sedimentary interface is present between the Tudor Formation and derived-overlying rusty and sericitic sediments. This contact is intensely deformed through a series of northeast trending folds traceable across the township. The contact is marked by a zone of sulphide enrichment up to 40 feet wide. This zone is notably silicified and contains numerous small lenses of massive and semi-massive pyrite/pyrrhotite with minor base metals. Gold is hosted by one or more sheeted, fissure (quartz and quartz-carbonate) vein systems with widths ranging from less than one inch up to 3.5 feet. Potentially economic mineralization is localized within each vein into one or more ore shoots, typical of other epigenetic deposits. Gold occurs as discrete free particles, in tellurides and within or associated with chalcopyrite. Arsenopyrite is rarely observed at Bannockburn. The veins continue to transect the stratigraphy above and below the volcano-sedimentary contact".

Noranda Incorporated has acquired property in the Marmora Township area and is exploring for gold.

Steep Rock Resources Incorporated explored for calcium carbonate and other industrial minerals. The company diamond-drilled its mica prospect in Hungerford Township in September, 1986.

C.R. Young continued to explore for industrial minerals and precious metals. Assessment work was received showing the geology of a Madoc Township talc deposit that is held by Mr. Young and J.L. Byers (local file number MAC062).

MINING ACTIVITY

Mining activity in Eastern Ontario continued this year at about the same or at slightly lower levels than last year. Mining activity in the Tweed Resident Geologist's area is shown on Figure 13.3.

Stokiosar Marble Quarries Limited report shipments to be down a little from last year, reflecting a slight drop in construction of office buildings. The company operates several quarries and a crushing, sizing, and bagging plant near Madoc, Ontario, to produce terrazzo chips and ground marble for fillers and stucco.

Canada Talc Limited continued to operate their talc mine at Madoc. High-purity white talc is mined underground from the Henderson orebody, and lower grade talc and talcose dolomite were mined before 1986 from two open pits on the Madoc mine site. High-purity talc is processed at the Madoc site, and lower grades of ore are processed at Canada Talc's mill in Marmora and at the William R. Barnes Company Limited mill in Northbrook. A large quantity of ore which had been stockpiled from the "east pit" prior to 1986 was shipped out for processing in 1986. The company is currently concentrating on underground development at Madoc. A decline to establish a new underground mining level was being driven during 1986.

A.L. Blair Construction Limited continued to produce agricultural lime. This limestone quarry is located in Finch Township at St. Albert, east of Ottawa.

Canada Brick, in Russell Township, southeast of Ottawa, continued to produce brick from Queenston Formation shale.

Granimar Resources, a Quebec company, acquired the Straw Hill Granite Quarries in Rear of Leeds and Lansdowne Township. They crushed waste rock from these building stone quarries, and shipped this product for use as exposed aggregate.

Steep Rock Resources Incorporated completed construction at Perth of their ultra-fine plant to grind and float micron-sized calcite. Mining and processing of their high-brightness calcite continued at high levels.

Fairmont Granite Limited continued to operate their Battersea Granite Quarry to fill continuing contracts. The quarry was much enlarged this year, and a new working face was developed just to the north of their main working area. Operations ran from May to November. The company ships blocks to finishing plants in Beebe, Quebec, where the blocks are sawn into thin sheets for exterior building cladding.

The Sloan Quarry in Storrington Township maintained a level of production similar to last year. The company produces sandstone ashlar blocks ranging from pale yellow, through pink and gold colours, to deep red. This attractive stone finds ready acceptance for fireplace, feature wall, and patio and house construction.

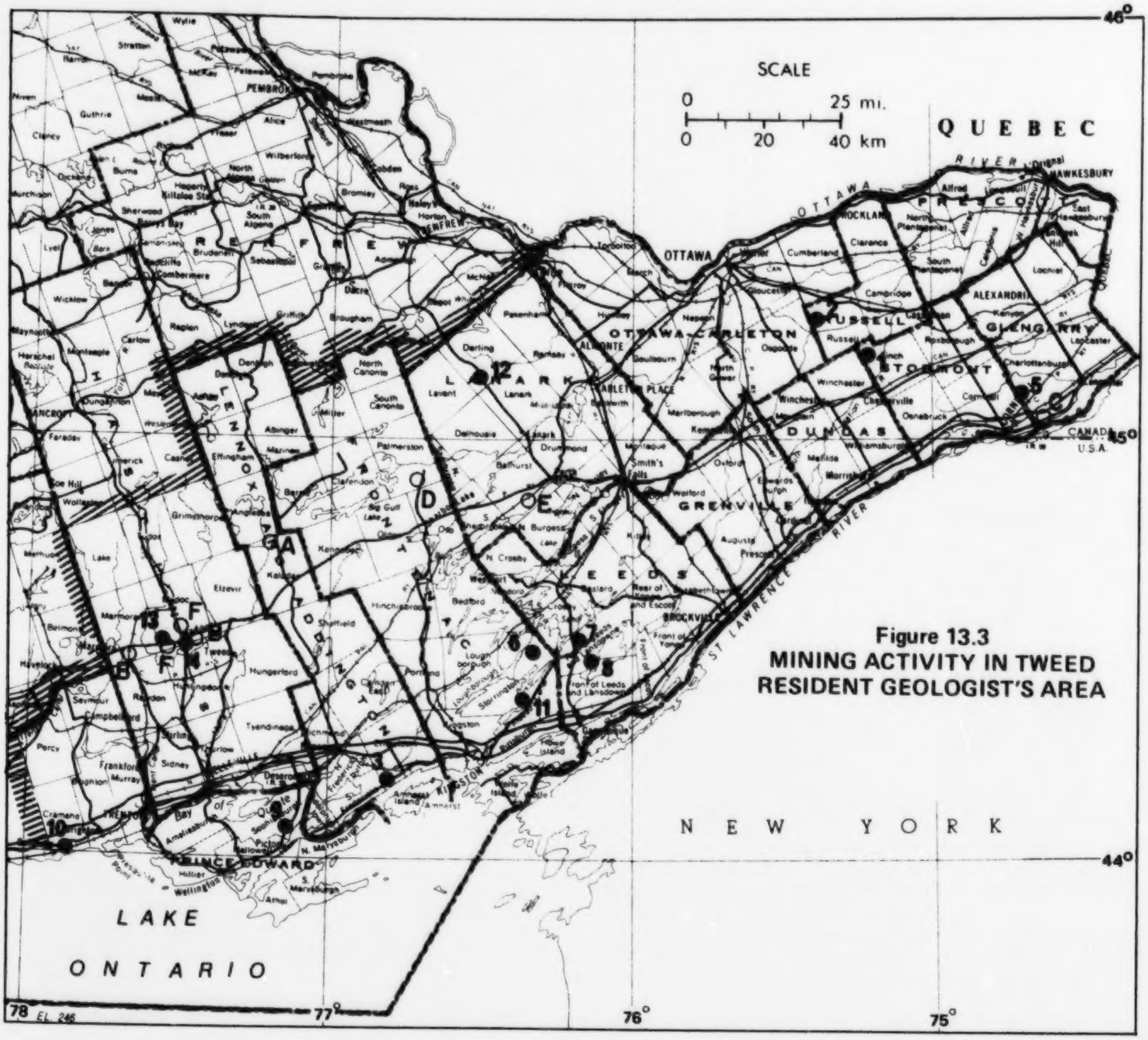
ONTARIO GEOLOGICAL SURVEY

Several Ontario Geological Survey (OGS) studies were carried out in the Resident Geologist's area in 1986. Geological mapping activities carried out in the Resident Geologist's area by the OGS and other agencies are shown on Figure 13.4.

A report entitled "The Limestone Industries of Ontario" is being prepared, which will give detailed technical and geological information about Ontario's limestone resources. This report will be an updated version of reports by Hewitt (1960, 1964) and Hewitt and Vos (1972), and involves OGS geologists and the consulting firm of Derry, Michener, Booth and Wahl. As part of this project M.A. Vos examined marbles in Darling Township, in the Resident Geologist's area. R.R. Wolf mapped detailed geological sections of all operating quarries in the Resident Geologist's area, and identified abandoned quarries.

Under COMDA funding, OGS geologists worked on the Madoc Unconformity Study. G. DePrisco performed detailed mapping of sites on the Precambrian-Paleozoic unconformity, and P. Churcher carried out detailed mapping of Post-Ordovician calcite, barite, fluorite, celestite, galena, sphalerite, and chalcopyrite veins, which may be related to the unconformity.

New OGS publications which pertain to the Resident Geologist's area include:


SCALE
0
25 mi.
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20
40 km
QUEBEC
OTTAWA RIVER
OTTAWA
HAWKESBURY
PRESCOTT
RUSSELL
GLENGARRY
STORMONT
DUNDAS
GRENVILLE
OTTAWA-CARLETON
LANARK
LEEDS
RENFREW
PEMBROKE
RENFREW
BROCKVILLE
KINGSTON
TRENTON
PRINCE EDWARD
CANADA
U.S.A.
ST LAWRENCE RIVER
NEW YORK
LAKE ONTARIO
46°
45°
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78
77°
76°
75°
EL 246
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6
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8
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10
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13
A
B
C
D
E
F

Figure 13.3
MINING ACTIVITY IN TWEED RESIDENT GEOLOGIST'S AREA

EXPLANATION

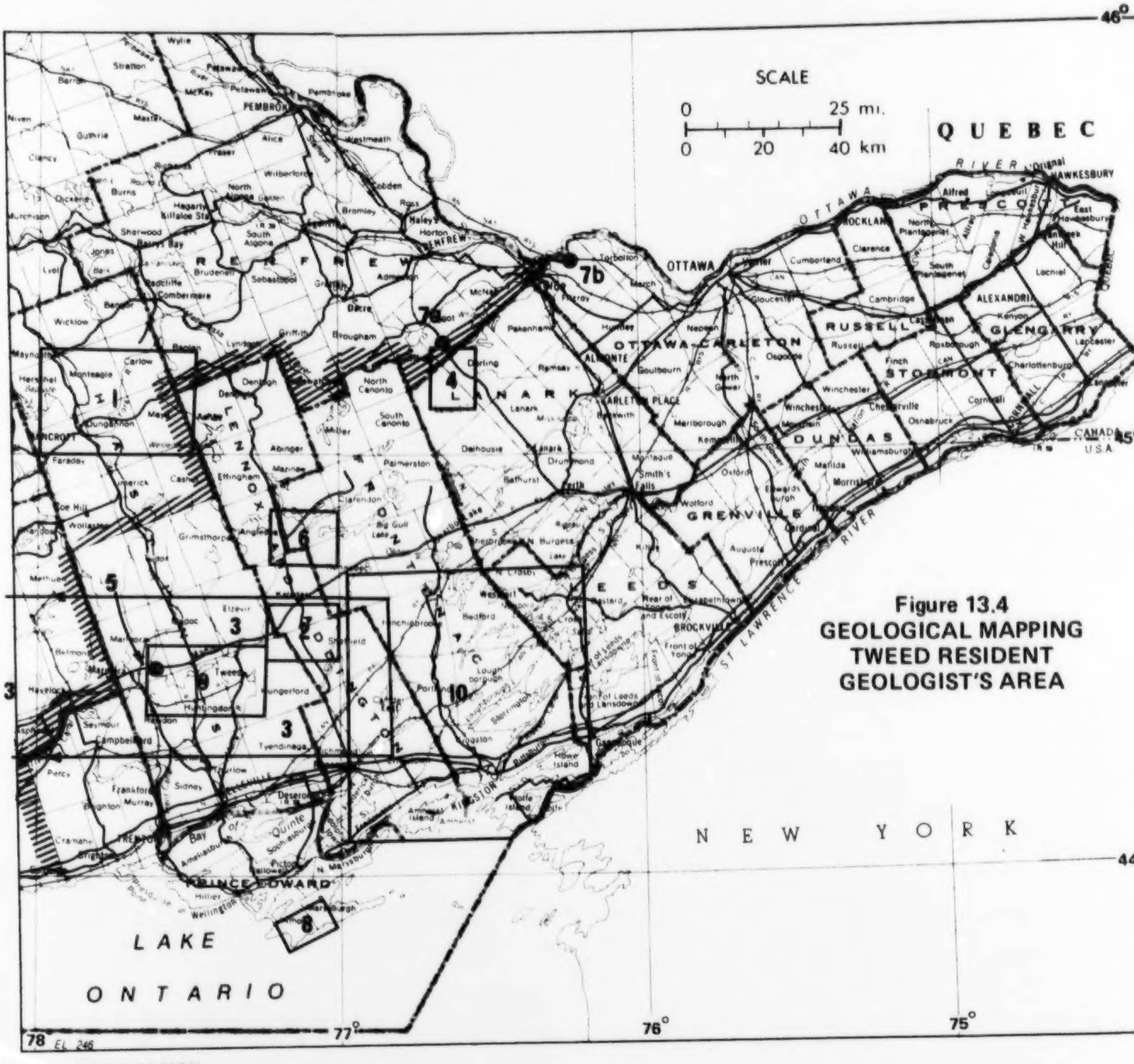
● 5 Producing Mines

1. A. L. Blair Construction Ltd. . . . . lime
2. Canada Brick . . . . shale for brick
3. Canada Cement Lafarge Ltd. . . . . limestone, cement
4. Canada Talc Limited . . . . .talc and marble
5. Cornwall Sand and Gravel . . . . .monument stone
6. Fairmont Granite . . . . dimension stone
7. Granimar Resources . . . . .decorative aggregate
8. W. Jackson . . . . decorative stone
9. Lake Ontario Cement Co. Ltd. . . . . . . limestone, cement
10. St. Lawrence Cement Co. Ltd., Ogden Point Quarry. . . . . limestone, cement
11. N. Sloan . . . . decorative stone
12. Steep Rock Calcite Division . . . . calcium carbonate
13. Stoklosar Marble Quarries Ltd. . . . . .marble

▨ Boundary of Resident Geologist's Area

○ E Operating Mills

A. W. R. Barnes Co. Ltd.
B. Canada Talc Ltd.
C. Karnuk Marble Ltd.
D. Ram Petroleums Ltd.
E. Steep Rock Calcite Division
F. Stoklosar Marble Quarries Ltd.


SCALE
0
25 mi.
0
20
40 km
QUEBEC
OTTAWA
RIVER
ST LAWRENCE RIVER
NEW YORK
LAKE ONTARIO
CANADA
U.S.A.
RENFREW
LANARK
LENNOX
FRONTENAC
HASTINGS
PRINCE EDWARD
OTTAWA-CARLETON
RUSSELL
PRESCOTT
STORMONT
GLENGARRY
DUNDAS
GRENVILLE
LEEDS
KINGSTON
BROCKVILLE
PEMBROKE
HAWKESBURY
1
2
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4
5
6
7a
7b
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9
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46°
45°
44°
78
77°
76°
75°
EL 246

Figure 13.4
GEOLOGICAL MAPPING
TWEED RESIDENT
GEOLOGIST'S AREA

EXPLANATION

1. Bancroft Surficial Geology (Barnett and Leyland 1986)
2. Mellon Lake Area Precambrian Geology (Bright 1986)
3. Source Rock Geochemical of Pleistocene Tills (Brand and Terasmae 1986)
4. Development and Adaptation of Geochemical Techniques (Gleeson et al. 1986)
5. Wollastonite in Marmora Township (MacKinnon 1986b)
6. Geology of the Marble Lake Area (Moore and Morton 1986)

7a,b Spectral Geobotanical Investigation of Mineralized Till Sites (Singhroy, Stanton - Gray, Springer 1986)

8. Geologic and Seismotectonic Studies (Singhroy et al. 1986)
9. Structural Setting of Fluorite Vein Deposits (Williams and Thompson 1986)
10. Seismic Reflection Investigation

1. Ontario Geoscience Research Grant reports on till geochemistry by Brand and Terasmae (1986), and Gleeson *et al.* (1986), and on seismic reflection investigations by Woods (1986)
2. geochronology maps and a report by Easton (1986a,b,c)
3. precambrian geology maps and reports by Bright (1986), and Moore and Morton (1986)
4. Report of Activities 1985, of Resident and Regional Geologists, edited by Kustra (1986)
5. a surficial geology map of the Bancroft area by Barnett and Leyland (1986).

GEOLOGICAL SURVEY OF CANADA

Two COMDA-funded mineral deposits studies were being carried out in 1986 by the Geological Survey of Canada (GSC) in the Resident Geologist's area. A. Menard carried out detailed mapping and sampling of marble-hosted zinc deposits, and S. Black mapped and sampled sillimanite deposits. The Resident Geologist was involved as an advisor in both of these projects which will continue into 1987.

REMOTE SENSING

The Ontario Centre for Remote Sensing (OCRS) performed surveys at the Kingdon Lead Mine near Galetta in West Carleton Township, and near the Dempsey Lake Celestite Deposit in Bagot Township. This project involves testing the relationships of spectral variation in vegetation growing over Post-Ordovician lead-zinc and strontium-barium veins. V.H. Singhroy of the OCRS presented a talk about this project at a remote sensing meeting in Nevada (Singhroy, Stanton-Gray, and Springer 1986). D.A. Williams of the Resident Geologist's Office mapped bedrock around the Kingdon Mine in support of this project.

The OCRS, in cooperation with the OGS, Ontario Hydro, and the Atomic Energy Control Board, carried out seismic hazard studies in part of Prince Edward County. During this study, a false-colour infrared airphoto mosaic was prepared for the southern part of the county. The mosaic was exhibited at the OGS Open House in December (Singhroy, White, Bowlby, and Wallach 1986).

GEOLOGICAL MAPPING FROM THE RESIDENT GEOLOGIST'S OFFICE

BUILDING STONE

A three-year building stone project, funded by COMDA, is being carried out by C.P. Verschuren. The emphasis of this project is to identify and evaluate dimension stone resources. Dimension stone includes architectural panels for exterior and interior curtain wall construction and flooring. These architectural end uses constitute the largest and fastest-growing building stone markets. Work done on building stone in 1985 was published in Open File Report 5585 (Verschuren *et al.* 1986).

This year's field work concentrated on granites. Literature research was supported by airphoto interpretation to locate the largest outcrop exposures, to determine access and to estimate the rock's physical characteristics. Favourable sites were assessed in the field and sampled. Large samples, measuring 0.5 by 0.5 by 0.5 m, were collected from 30 sites, for cutting and polishing. Detailed follow-up studies of the most promising sites are planned for 1987 and 1988.

Over 100 sites have been documented to date from 40 plutons in Eastern Ontario. Two plutons identified in 1986 which show potential for building stone are the Mount Moriah Syenite north of Madoc in Hastings County, and the McLean Pluton east of the Village of Arden in Frontenac County. This year's work was described in the Summary of Field Work (Verschuren 1986). A display of cut and polished stone was shown at the OGS Open House in December, 1986.

REFRACTORY MINERALS

An 18-month project was initiated to determine the quantity and quality of refractory industrial minerals available in Eastern Ontario. This COMDA-funded project is being carried out by A. MacKinnon, and comprises:

1. a detailed literature search to identify available resources, specifications, and uses
2. field reconnaissance and geological mapping of refractory mineral occurrences
3. detailed geological mapping of sites with good potential
4. collecting of bulk samples for testing to determine the quality and quantity of products that could be beneficiated.

Most of the 1986 field work concentrated on dolomite and magnesite. Preliminary field work was done on sillimanite.

Literature research showed that rocks of Paleozoic age in Eastern Ontario are either too thin or too impure to meet the specifications for use as a refractory mineral. Precambrian age marbles show good potential as sources of high-purity dolomite, and 34 marble areas were reconnoitered in the field.

Several areas showed potential for high purity, but large tonnages were not identified this year. Marble in lot 1, concession XIII, Madoc Township, and lot 10, concession XI, Ross Township, appeared to be exceptionally pure. These two sites may support selective mining of refractory dolomite.

Work on refractory minerals was described in the Summary of Field Work (MacKinnon 1986a).

STRUCTURAL SETTING OF THE MADOC AREA FLUORITE VEINS

As part of the COMDA-funded Madoc Unconformity Project, D.A. Williams and L.G.D. Thompson investigated the structural setting of the Madoc-area fluorite veins. The unconformity project is a joint project of Tweed Ministry of Northern Development and Mines (MNDM) and the OGS Mineral Deposits Section.

Fluorite-bearing veins occur in a zone approximately 15 km long and 5 km wide, trending southeasterly through the southwestern part of Moira Lake.

Mining was conducted from 1905 to 1961. Veins are present above and below the Precambrian-Paleozoic unconformity, and their localization was influenced by normal faults. The distribution of the faults was poorly known, resulting in an inadequate understanding of the structural and stratigraphic setting of the veins.

Geological field work in 1986 comprised examining Paleozoic outcrops and locating Precambrian outcrops, to detect vertical displacement and to determine the location of faults. The abandoned Marmoraton open pit Iron Mine provided a reference section.

Geophysical work on this project consisted of seismic refraction profiling at O'Hara Mill in Madoc Township. In 1984 and 1985, seismic profiling yielded fault responses at three other sites in Madoc, Huntingdon, and Hungerford Townships (Thompson 1986).

Work on the structural setting of fluorite veins was described in the Summary of Field Work (Williams and Thompson 1986). A 1:50 000 scale map of geological structure in the Madoc area was shown at the OGS Open House in December, 1986.

TALC

An inventory of talc deposits in Eastern Ontario is being completed by S. van Haaften. This project comprised an extensive literature search and field reconnaissance, and geological mapping and sampling of selected deposits. Forty-eight talc deposits were identified.

Talc in Eastern Ontario is associated with three distinct rock types: dolomitic marble, mafic volcanic rock, and altered skarn.

Talc has been produced continuously since 1896 from the dolomitic marble-hosted Canada Talc Limited Deposit at Madoc in Hastings County. Talc was produced in the past from dolomitic marble near Eldorado in Madoc Township, from volcanic rocks in Elzevir Township, and from skarns in Pakenham, Pittsburgh, and South Burgess Townships.

The potential for new talc mining appears very good in Elzevir and Madoc Townships in volcanic rocks along the western margin of the Elzevir granodiorite batholith. Large tonnages of talc exist in this area. Canada Talc Limited has outlined a talc deposit in Elzevir Township. The company has built a road to the deposit, and cleared the land in preparation for mining. Twin Buttes Exploration Incorporated carried out a diamond-drilling program in 1985 to outline a large talc body near Cooper in Madoc Township. The Canadian Mines Handbook (Gardiner 1986) reported that seven diamond-drill holes indicated a possible 2 million tons to 30 m depth at the Twin Buttes Property.

A display about Eastern Ontario Talc was shown at the OGS Open House in December, 1986.

WOLLASTONITE

A recent discovery of wollastonite in Marmora Township lots 5, 6, and 7, concession VIII, was acquired by Black Hawk Mining Corporation (formerly Platinova Resources Limited). COMDA-funded mapping by A. MacKinnon confirmed significant quantities of wollastonite over a minimum strike length of 1200 m and a maximum width of 100 m.

Wollastonite is used as filler in ceramics, plastics, paints, adhesives, insulating materials, sealants, resins, bonded adhesives, and wall boards. It is also used as an extender to replace non-fibrous materials and asbestos, as metallurgical flux, and in the manufacture of glass (Smith 1981, Choate 1983). Wollastonite's potential in the future appears very promising, particularly in the long fibre market (Power 1986).

Work on the very promising Marmora Township wollastonite deposit was described in the Summary of Field Work (MacKinnon 1986b). Reconnaissance geological mapping by MacKinnon and assistants in the Fall of 1986 has identified wollastonite in outcrop in four other locations in Marmora Township. These are: lot 6, concession VIII; lot 13, concession VIII; lot 16, concession X; and lot 19, concession II. The five known occurrences in the area are shown in Figure 13.5. These occurrences are geologically similar, have similar mineralogy and texture, at least in hand specimen, and are enclosed by similar rocks.

A map and samples were shown at the OGS Open House in December, 1986.

GEOPHYSICS by L.G.D. Thompson[4]

[4]Geophysicist, Southeastern District, Ministry of Northern Development and Mines, Tweed.

The office of the Geophysicist primarily applies and performs geophysical surveys in support of the geological projects conducted under the Resident Geologist, MNDM, Tweed, and under the Regional Mines Coordinator, Eastern Region, Ministry of Natural Resources (MNR), Kemptville. Survey services are also provided to the Ontario Geological Survey, MNDM; Central Region, MNR; and other Regions and agencies on request.

A major activity of the Geophysicist is the development of new or improved instrumentation systems and survey methods required for the special surveys demanded by the geological projects. The Geophysicist also provides consultative service as required to mineral exploration companies and individuals.

In 1986, seismic field surveys constituted most of the geophysical work done. Some alpha-meter and scintillometer radioactivity surveys, resistivity surveys, and auger-drill holes were also completed.

CAPS—COMPUTER AIDED PORTABLE SEISMOGRAPH

A new portable 12-channel seismograph-computer system was assembled to meet the special requirements and work load of the COMDA Buried Aggregates and Blending Sand projects. The system consists of a new type of Geometrics 12-channel ES-1225® portable seismograph linked directly to an IBM Portable PC® computer. The rest of the equipment has been described previously (Thompson 1985a, 1986b). The computer is operated by a special inverter which is run by a battery. The seismograph is directly battery operated. The major advantages of

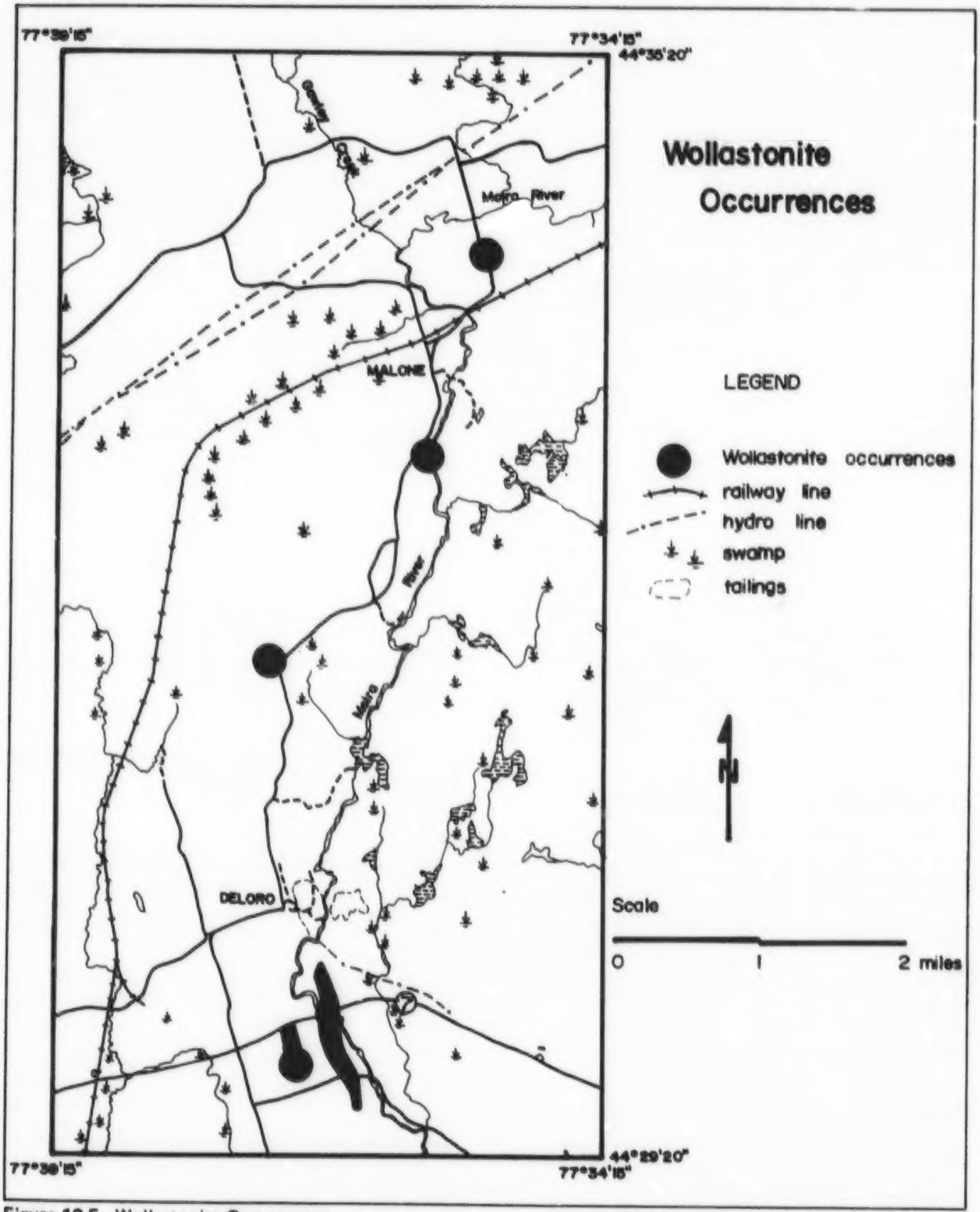
77°39'15"
77°34'15"
44°35'20"
Wollastonite
Occurrences
Creek
Moira River
MALONE
River
Moira
DELORO
LEGEND
Wollastonite occurrences
railway line
hydro line
swamp
tailings
N
Scale
0
1
2 miles
77°39'15"
77°34'15"
44°29'20"

Figure 13.5 . Wollastonite Occurrences

this system are that a) the data from the 12 geophones are recorded simultaneously which speeds up the survey, and b) the 12 geophone traces are stored directly onto a computer disk for further processing. Also, a hard copy of the 12 traces is obtained directly from the seismograph. Computer processing greatly enhances the data reduction procedure and reliability of the results. Computer programs for processing and presenting seismic data have also been assembled.

COMDA BURIED AGGREGATES AND BLENDING SAND PROJECTS

The major portion of the summer seismic field survey program was in support of the COMDA Buried Aggregates and Blending Sand projects being conducted under the Regional Mines Co-ordinator, Eastern Region, MNR, in Kemptville. Seventy-one refraction and/or reflection seismic lines, and some test lines, were completed at sites selected by the Eastern Region geological staff in Russell, Dundas, Leeds, and Frontenac Counties and in the Ottawa-Carleton Regional Municipality. The seismic results provide information on the bedrock depths and the existence of buried sand or gravel deposits in eroded bedrock channels.

SLOPE STABILITY STUDY

In support of the slope stability study being conducted by the office of the Regional Mines Co-ordinator, Eastern Region, MNR, and the South Nation River Conservation Authority, 16 seismic lines and one overburden test line were completed at sites selected by the Eastern Region geological staff in the vicinity of Lemieux, Ontario. The seismic results gave bedrock depths to support a borehole drilling program. The results indicate that the Lindsay Formation limestone bedrock dips north-westerly toward the South Nation River.

BROCK TOWNSHIP BEDROCK STUDY

At the request of the Regional Geologist, Central Region, MNR, and the District Geologist, Maple District, MNR, a seismic survey was performed in the northwestern part of Brock Township. The purpose was to outline areas where Verulam and Lindsay Formation limestone bedrock is close to the surface, in order to update Ontario Geological Survey Aggregate Resources Inventory Paper 6. Six seismic refraction lines and seven auger holes were completed. Depths-to-bedrock were determined at six sites by seismics and at five sites by auger holes. Two auger holes did not reach bedrock.

GEORGETOWN AREA SANDSTONE STUDY

At the request of the Regional Geologist, Central Region, MNR, two seismic lines were completed in a field on the southern side of the Rice and McHarg Sandstone Quarry. The purpose was to determine whether or not the sandstone beds currently being quarried continued to dip to the south to inaccessible depths. The seismic results show that the sandstone does, in fact, rise again almost to the surface. This opens the possibility of expanding the nearly depleted quarry into this field.

GEOPHYSICAL STUDY OF FLUORITE DEPOSITS

A geophysical investigation of the Moira Fault and associated fluorite deposits in the Madoc area (Thompson 1986) was continued in 1986. This work supported, and was partially funded by, the COMDA Unconformity Study project.

A seismic bedrock profile over 1 km in length was completed at the O'Hara Mill site along the 5-6 side road across most of concession III and part of concession IV, Madoc Township. The seismic results identified and located a major fault between Lower Bobcaygeon Formation limestone on the west and Precambrian basement on the east, just at the western end of the survey line. The remainder of the line mapped the subsurface knolls and ridges of the Precambrian basement. This survey was done in conjunction with the study of the structural setting of fluorite deposits being done by D.A. Williams, Geologist, Tweed, under the COMDA Unconformity Study project. The seismic results are reported in a published paper (Williams and Thompson 1986).

Additional geophysical surveys were performed at the Buller Siding site in lot 1 on the concession IX road in Hungerford Township to supplement seismic and EM-31 conductivity surveys done in 1985 (Thompson 1986). Alpha-meter measurements for radon gas concentrations were made at 4 m intervals along most of the survey line. Small increases in alpha particle counts were observed at some locations but the results are generally inconclusive. A resistivity profile was done along the survey line using a Scintrex RSP-6* resistivity unit. A Wenner spread of 20 m was used which gave a depth penetration of over 10 m. The resistivity results confirmed the previous EM-31 conductive anomaly obtained over the near-surface limestone bedrock just west of the bedrock depression, taken to be a fault zone. Several auger holes were also drilled to check the overburden thickness.

COMDA UNCONFORMITY STUDY PROJECT

At the request of Dr. Janet Springer, Mineral Resources Development Geologist, MNDM, Sudbury, test seismic lines were performed at six sites in the Eldorado area of Madoc Township north of Madoc, Ontario. This work was done in support of the COMDA Unconformity Study project to define the Precambrian unconformity in Eastern Ontario through remote sensing techniques. The possibility of remotely sensing the unconformity by colour aerial photography and/or satellite thermal imagery has been reported by Springer (1985). A thermal image map of the Eldorado area derived from Landsat 4 data showed many thermal anomalies or "hot spots" that were apparently related to slight topographic relief and near-surface underlying bedrock. Also, colour aerial photography, flown over the area in 1983, showed several conical hills that appeared to be erosional remnants of Precambrian karst topography (Springer 1985). The purpose of this seismic survey was to demonstrate the application of the seismic method for ground proofing the remotely sensed anomalies. More particularly, it was to test some of the "hot spots" and conical hills near Eldorado to determine the depth to bedrock and the type of overlying material.

Eight seismic lines over three "hot spots" and three conical hills plus some bedrock velocity test lines were completed. D.A. Williams, Unconformity Study Project Geologist, Tweed, assisted in the selection and geological evaluation of the sites. Bedrock depths of about 2.5 m or less were also checked by auger holes. The seismic refraction method was able to determine the type and depth of bedrock (up to about 15 m) as well as type and thickness of overburden layers. Each of the sites tested was different in surficial and bedrock character. Detailed analysis of the results must still be completed.

ONTARIO HYDRO BEDROCK STUDIES

In conjunction with a drilling program done by Ontario Hydro in the Roblindale Quarry just south of Roblin in Camden Township, several seismic refraction test lines were done on the quarry floor. The purpose was to try and map the Precambrian basement below the Gull River Formation dolomite of the quarry floor. Seismic tests indicated that for the small velocity contrast involved, a seismic line at least 200 m long was required. The maximum possible line length across the quarry floor was only 150 m so that no useful results could be obtained.

At the request of the Senior Engineering Geologist, Geotechnical and Hydraulic Engineering Department, Ontario Hydro, and in conjunction with the construction of a new transmission line, a test seismic survey was performed over a weathered and jointed Bobcaygeon Formation limestone outcrop area northwest of Kingston. The purpose of the survey was to investigate the depth of water-eroded jointing and cavities in the surface limestone and thus indicate the depth to a solid base for transmission line towers. At a tower site just west of Glenvale, nine test refraction lines were completed. Four lines were radial to a drillhole 10 m in depth. One line was shot with a geophone at the bottom of the hole. The seismic results indicate that the eroded or broken layer is about 5 m deep on the average.

CONSULTATION SERVICES

Geophysical assistance and information was provided to two Ontario Geological Survey field parties working in the Tweed area. One was conducting a study of the Deloro Pluton and the other was studying the fluorite deposits in the Madoc area. Geophysical consultation was also provided on over 10 occasions to mineral exploration companies and individuals.

In December, 1986, at the Ontario Geological Survey Geoscience Research Seminar, the Geophysicist presented a demonstration of a new Computer Aided Portable Seismograph system and a poster display illustrating the projects to which the engineering seismograph has been applied.

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14. Central Region Geologist's Area, Central Region

Mahendra Narain[1] and Jackie Burkart[2]

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INTRODUCTION

The mineral production outlook for Central Region remains optimistic in 1986. Aggregate production in 1985 increased 8.5 percent over 1984 production. The Region's three gypsum mines also reported production increases in the current year. Demand for natural building stone continues to grow and sandstone quarry operators are looking for new sources of this decorative stone. Although no gold production was recorded in Belmont Township, Peterborough County, exploration for various commodities remains relatively active.

Presently, Central Region has 877 licenced pits and quarries. As well, 97 wayside pit and quarry permits have been issued in 1986.

The Regional Geologist continued to administer geological programs related to geoscience information, data collection, and mineral resource management. Geoscience information and consultative services are provided by the Regional and five District Offices to various government agencies, mining companies, consulting firms, teachers, students, and the general public. Technical direction by the Regional Geologist is provided for District Mineral Resource Programs.

Current staff at the Regional Office includes: Martin Groneng, Regional Lands and Mineral Resources Coordinator; Jackie Burkart, Lands and Minerals Technician; and June Feeney and Barbara Crowe, secretaries.

Staff at the District Offices include: Tom Cumby, Lindsay District; Bill Fitzgerald, Huronia District at Midhurst; Amar Mukherjee, Maple District; Don Routly, Cambridge District; and John Fraser, Niagara District at Fonthill.

REGIONAL GEOLOGIST'S ACTIVITIES

RESOURCES AND LAND USE PLANNING

The Regional Geologist devoted a large part of his time to the promotion of shale resources of the Region for the manufacture of bricks and roofing tiles. As a result of the two studies initiated in 1984 and 1985 to assess the suitability of shale resources of the Region, new interest has been generated among potential investors. The 1985 study is currently available (Martini and Kwong 1986). Central Region's resources are very attractive to potential users due to their proximity to markets and reduced transportation costs.

A good deal of time was spent in assisting the sandstone industry to locate and evaluate new sources of supply. There has been a considerable increase in demand for natural stone products, and the three producers in the Region are unable to meet this demand due to the shortage of skilled labour and the availability of suitable resources. The Regional Geologist has been working with the owners of three quarries to assist them in both these areas.

The Regional Geologist conducted field investigations of both licenced and unlicenced sites to identify potential resources of shale and building stone. Several new 'suitable' sites for shale and sandstone extraction have now been identified which may interest potential investors. It was planned to conduct some testing and sampling, but due to lack of funds this was not possible.

Assessment of aggregate resources in the Region is also being conducted on a piecemeal basis due to the lack of funding. The inventory of all past and present mineral commodities is now available in the form of a map, which is now available from the Region.

CONSULTATIVE AND EDUCATIONAL SERVICES

Central Region Office and the five District Offices continued to provide consultative services relating to geology, mineral resources, and legislation. Inquiries relating to mining and mineral resources production, geology, mining-related investment opportunities, and minerals in general, have increased at both the Regional and District levels.

District staff arranged various geological and mineral resources-related tours, seminars, and exhibits for numerous mineral clubs, junior rangers, boy scout groups, high school and post-secondary students, pit and quarry operators, local and regional municipalities, Ministry personnel, and other interested groups.

PROPERTY EXAMINATIONS

The Regional Geologist conducted field investigations on his own and with the District and Eastern Region staff to identify potential resources. Several 'suitable' sites for shale and sandstone extraction have been identified which may interest potential investors. Licenced pits and quarries in the Central Region are indicated in Table 14.1.

GEOLOGY AND MINING—RELATED ACTIVITIES

Central Region remains the largest producer of structural materials in Ontario. Mineral production includes: sand and gravel, limestone, dolostone, sandstone, shale, gypsum, trap rock, granite, clay, peat, oil and gas, some gold and silver, silica sand, and sulphur. Most of the minerals produced in this Region are used in the manufacturing and construction industries.

In 1985, approximately 61 million tonnes of mineral aggregate was produced in Central Region. This represents an 8.5 percent increase over the 1984 production figure of 56.2 million tonnes. This increase is due to steadily improving economic conditions in the construction industry. A total of 97 permits was issued for wayside pits and quarries in the 1985/1986 fiscal year in Central Region.

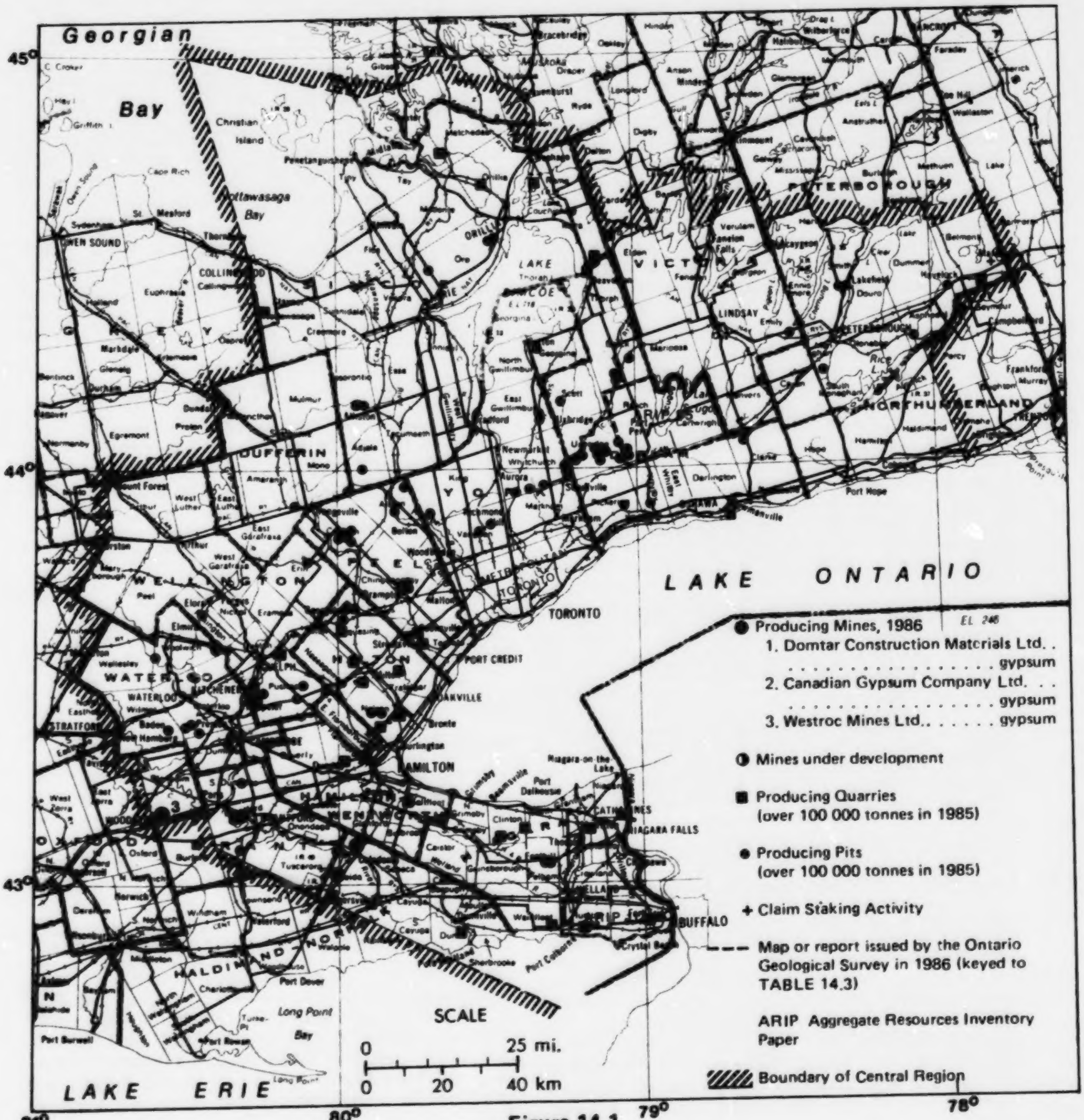
Georgian Bay
LAKE ONTARIO
LAKE ERIE
45°
44°
43°
81°
80°
79°
78°
TORONTO
PETERBOROUGH
NORTHUMBERLAND
VICTORIA
DUFFERIN
WELLINGTON
WATERLOO
HALDIMAND-NORFOLK
BUFFALO
SCALE
0 25 mi.
0 20 40 km
EL 246
● Producing Mines, 1986
1. Domtar Construction Materials Ltd. . . . . gypsum
2. Canadian Gypsum Company Ltd. gypsum
3. Westroc Mines Ltd.. . . . . . . gypsum
◑ Mines under development
■ Producing Quarries (over 100 000 tonnes in 1985)
• Producing Pits (over 100 000 tonnes in 1985)
+ Claim Staking Activity
- - - Map or report issued by the Ontario Geological Survey in 1986 (keyed to TABLE 14.3)
ARIP Aggregate Resources Inventory Paper
▨ Boundary of Central Region

Figure 14.1
CENTRAL REGION

TABLE 14.1: LICENCED PITS AND QUARRIES IN THE CENTRAL REGION

District	Licenced Quarries	Licenced Pits
Maple	10	139
Niagara	19	16
Lindsay	11	246
Cambridge	22	214
Huronia	10	190
Total	72	805

Gypsum is produced at three locations within the Region: by Westroc Industries Limited at Drumbo, in Blenheim Township; by Canadian Gypsum Company near Hagersville; and by Domtar Construction Materials Limited at Caledonia. Domtar is presently undertaking a major expansion of their underground workings, in addition to a 3.5 million dollar expansion to their crushing mill and drying plant.

Sulphur is produced at two locations in the Region as a by-product of oil and gas refining. Petro-Canada at Mississauga processes liquid sulphur from crude oil imported from Alberta. Sulphur blocks, the by-product of sour natural gas processing from natural gas wells in Alberta, are imported by Holly Industries at Milton, where they are crushed to a powder, or flour, and processed for use in steel mills, rubber products, paint and paper, explosives, etc.

No gold production was recorded by Lasir Gold Incorporated at Cordova Mines in Belmont Township in 1986, although exploration activities continued.

The following highlights the activities of some of the mineral producers and consulting firms within the Central Region as reported by the respective companies.

DEFOREST BROTHERS QUARRY, CALEDON

This is a direct quote from a company report:

> "Demand for sandstone products has increased considerably. The Company is unable to find suitable trained personnel to meet demand for various products. Also they need new sources of grey sandstone to achieve suitable blend and customer needs. The Company is looking for more information on sources, and will try to reach an agreement with Hazel Norrie, as suggested by the Region, to operate her quarries which are already licenced."

RICE AND McHARG QUARRIES LIMITED, GEORGETOWN

This is a direct quote from a company report:

> "This past year we just obtained a licence for an additional ten acre extension to our present sandstone quarry. We are now in the process of stripping to expose an area which should keep us busy over the next three to five years.
>
> The market for sandstone was extremely good in 1986 due to the construction boom and also due to the fact that imported stone from the United States is very expensive due to the dollar value. We anticipate the demand to be strong in 1987 also, but have been told by some of our buyers that they expect a drop in sales once the majority of construction is completed which was started in 1986.
>
> Our production will remain essentially the same, since we do not expect to have additional employees due to restrictions on extraction which is a condition of our licence. We hope to expand in future years providing that the stone deposits are as good as they have been on this property. As for modernization, we do not foresee much change as this process has not changed much in years. We do, however, understand that the natural stone is gaining popularity again since the man-made alternatives have crept up in price to make stone a viable alternative at a reasonable price increase.
>
> Our services basically provide hand cut Credit Valley sandstone which is used for landscaping, retaining walls, house fronts, patios, fireplaces and other various building uses. The product is very much the same as always, with occasional changes in colour from grey to brown and buff."

TRT SAND AND GRAVEL, ORONO

This is a direct quote from a company report:

> "Current production targets for winter stock are as follows:
>
> 3/4" Concrete Stone—200 000 tons
>
> Concrete Sand—500 000 tons
>
> 3/8" Concrete Stone—20 000 tons
>
> Granular A—100 000 tons
>
> Screened B—50 000 tons
>
> These are the major products that we will have in stock by year end 1986.
>
> Market conditions have produced a high demand for nearly all products produced by TRT Sand and Gravel and seem to be heading into 1987 in the same manner.
>
> We made some major changes to our washing plant and crushing plant in the spring of 1986 and anticipate very little change to our production equipment in 1987.
>
> Our business consists of 35% Ready Mix Concrete Aggregate supply. The remainder is concrete block plans and road and street construction in the Bowmanville, Oshawa, Whitby area.
>
> Our estimated total shipping for 1986 is 2.75 million tons. This is an increase of 400 000 tons over 1984 and 1985.
>
> Estimated shipping for 1987 is 2 million tons."

FRANCESCHINI BROTHERS AGGREGATES LIMITED, MISSISSAUGA

This is a direct quote from a company report:

> "Our Company is pleased to report that 1986 has been a very successful year. We have found especially in the second half of the year that the

> demand for our products has exhausted our supply and production. Another highlight of 1986 happened in May when the Presswood Property in the Town of Caledon was licensed. This will allow our company to increase production and help supply a variety of products in the Caledon and Brampton markets.
>
> In the past several years our capital expenditures have remained relatively the same. In 1986 the majority of our expenditure was a purchase of a five and half cubic yard loader. We feel this purchase will help us to become more cost efficient in the years to come. In 1987 we are going to expand our dry screen operations which will diversify our product lines and potentially increase our customer base.
>
> We feel that the healthy economic conditions that are present in 1986 will carry into 1987 and our Company looks for continued economic growth in our market area."

NATIONAL SEWER PIPE LIMITED, OAKVILLE

This is a direct quote from a company report:

> "The Aldershot area mainly supplies our manufacturing operations, namely St. Thomas and Wallenstein. Incidentally, the latter was just recently acquired and is located in the Kitchener area. While, as mentioned earlier, Aldershot supplies our plants, some tonnage is sold to outside customers such as Hamilton Brick. Our total production for 1986 was 14 258 tonnes. While there is no immediate plan for expansion or modernization, some projects are now being investigated by our Company and could impact on our Aldershot operations."

QUEENSTON QUARRIES

This a direct quote from a company report:

> "Queenston Quarries reports that market conditions and production levels remain unchanged from 1985. About 16 or 17 people are employed at the quarry site, full-time. No plant or quarry expansions are planned for 1987, however, the Company will be modernizing the plant by converting power generation from diesel to electricity. This changeover should take place in early 1987."

STRATA ENGINEERING CORPORATION, DON MILLS

This is a direct quote from a company report:

> "The Firm has been involved in Aquifer Thermal Energy Storage technology for a number of years. In this technology, groundwater is used to provide heating and cooling for buildings on a seasonal basis. The extracted groundwater is either cooled free of cost in winter and pumped into the ground for use later in summer, or it is heated during summer and stored in the ground for use in the winter.
>
> Under a research contract sponsored by Public Works Canada, the Firm has been monitoring the performance of ATES technology at the Canada Centre site in Scarborough, Ontario. The Canada Centre Building is now being cooled and heated using the energy available from the groundwater. Initial results are extremely positive, and the technology is proving itself as a real energy saver. Further work remains to be completed on the geochemical aspect of ATES technology. This particular project has proven of immense interest to the International Energy Agency, and to date the Firm has published several papers on its experience with this technology.
>
> More recently, the Firm has been involved in the modelling of surface crown pillar problems, particularly in soil-like rock masses. Not much information is presently available either in the characterization of such weak rock masses, or in modelling their stability behaviour. This work is being sponsored by CANMET. The Firm has successfully tried out a novel technique of recovering excellent core results in such weak rock masses by the use of compressed air in conjunction with the drill stem water, to minimize erosion of the core during diamond-drilling. For the modelling work, both a base friction technique, as well as several numerical techniques will be tried out, which will then be verified by field trials late in 1987, at a mine site near the northern Ontario-Quebec border.
>
> In connection with a potential groundwater problem for a Government Laboratory building in the London area, the Firm carried out a stochastic analysis of groundwater variation against environmental factors. The study developed a technique for forecasting groundwater table elevations on the basis of a few actual site readings. This study was used to decide on the lowest basement level of the proposed building to ensure it would not be flooded during times of high groundwater tables.
>
> The Firm is currently proposing expansion of its research capabilities into a study of the movement of lead in various types of soils, since not much is known about the soil physics of lead contamination."

GARTNER LEE LIMITED, MARKHAM

This is a direct quote from a company report:

> "Gartner Lee Associates Limited has had a busy year which culminated in late November with a new name, Gartner Lee Limited, and a new office facility at 140 Renfrew Drive, Markham (L3R 6B3). Our telephone number remains the same at (416) 477-8400. Geological, engineering, hydrogeological, biological and environmental studies have been conducted throughout Canada, in Germany and Oman in 1986. A large number of studies have been carried out in the M.N.R. Central Region.
>
> Gartner Lee staff has been involved in investigations at the Ontario Waste Management Corporation's West Lincoln site. A state-of-the-art industrial and liquid waste treatment and disposal facility is proposed for the site. Geologists, hydrogeologists and geotechnical engineers have supervised the drilling of more than 100

boreholes on and around the site. Detailed hydrogeological and geotechnical observations are being made on a continuing basis. The geology of the site has been assessed by 21 continuously sampled boreholes from surface into the Guelph Formation bedrock. Geologically this investigation is one of the most advanced subsurface investigations ever conducted in Canada. Detailed interpretation of the deposition of the Halton unit at the site will be published shortly.

Gartner Lee Limited has also conducted biological and surface water studies of the site.

Quaternary geology, geophysics and hydrogeology were combined to study the hydrogeology of parts of York Region on the Oak Ridges Moraine. The study is designed to locate additional groundwater supplies to support future development in the Region. Several other site specific water supply studies were carried out in the Central Region.

An upswing in the aggregate industry has brought a variety of requests for studies on both existing properties and new potential acquisitions throughout southern Ontario. Land development has proceeded at a brisk pace and specific studies have been addressed in Markham, Richmond Hill, Oshawa, Whitby and other areas.

Contaminant hydrogeological problems continue to demand attention. Studies and monitoring activities are presently underway at landfills at Niagara-on-the-Lake, Beare Road (Toronto), Burlington, Oakville, Whitby, Oshawa, Darlington and Guelph (to mention a few). Industrial land owners are registering increasing concern over possible contamination of their present properties and also any lands they propose to purchase. Individual industrial properties belonging to chemical manufacturing, oil refining, electrical equipment manufacturing, steel manufacturing and transportation companies have been examined in the last year. Many of these projects have been carried out in the Hamilton-Toronto area, but other activity areas include Sarnia, Eastern Ontario and the Maritimes.

Investigations for siting new waste disposal facilities — lagoons and landfills — have been ongoing in the Region of Niagara and the North Simcoe waste management area. Foundation investigations have been carried out in various localities (including the investigation for our new office!) and we are continuing to consult to the Metropolitan Toronto and Region Conservation Authority on slope stability problems along the Scarborough Bluffs.

The use of geophysical methods has increased markedly in the last two years. Geophysical studies are now being used as part of investigations on landfills, contaminant mapping, aggregate investigations and general investigations of subsurface geology.

New seismic techniques have produced remarkably accurate interpretations of subsurface conditions at the West Lincoln study site which have been confirmed by detailed drilling. Surface resistivity techniques have also been employed with excellent results in locating buried chemical wastes.

A significant recent development involves the determination of in-site permeability of geologic units. Gartner Lee Limited hydrogeologists have perfected a "Rapid Response Recording System" which is now being used to take extremely accurate water level measurements during the critical early moments of well pumping tests and slug tests. A mobile power source, borehole packer set up, data recorder and computer are part of the equipment. Data plots and solutions for permeabilities and hydrogeologic parameters can be generated on-site within minutes of test completion. The system can generate more accurate results in less time than traditional recording and solution methods and it can significantly reduce the costs of conducting these standard tests. It is particularly applicable to testing high permeability formations.

One final note involves the formation of a response team to deal with contaminant spills. The team includes hydrogeologists, geologists, hydrologists, geochemists, aquatic and terrestrial biologists in addition to general environmental and team management expertise. The team has responded to several recent spills in southern Ontario and Atlantic Canada, notably the large railroad acid spill near Parry Sound. Arrangements are being made to have the group available on a 24 hour a day, 7 day a week basis."

MORRISON BEATTY LIMITED, MISSISSAUGA

This is a direct quote from a company report:

> "Our firm has been very active during 1986. Studies completed this year ranged across the Province, from Sarnia to Ottawa and from Niagara Falls to Iroquois Falls.
>
> Morrison Beatty Limited, established in 1977, provides consulting geological, hydrogeological and engineering services. William D. Morrison and Brian W. Beatty, the founding principals, limit the practice to the assessment, development, control, management and protection of groundwater and to the control and recovery of gas generated at landfill sites. During 1986 our staff increased from 15 to 19 persons. This reflects both a booming economy and a Province wide increase in attention to groundwater as a major resource."

WESTROC INDUSTRIES LIMITED, DRUMBO

This is a direct quote from a company report:

> "Drumbo Mine is scheduled for 200 000 tons per year of 85% gypsum. Market conditions have been excellent for three years and should continue for another two.
>
> No expansion is planned except to replace equipment. New siding will be installed on headframe, and a grouting program will be started in January, 1987."

3M CANADA INCORPORATED, HAVELOCK

This is a direct quote from a company report:

> "The company operates a 30 ha basalt rock quarry that employs about 105 people. It also operates a mill and a colouring plant located approximately three miles (5 km) east of Havelock, immediately north of Highway 7.
>
> The original mill was started in 1907 by Ontario Rock Limited to produce aggregates for road surfacing. In 1948, Building Products Canada Limited took over the operations and built a colouring plant to produce artificially coloured roofing granules. 3M Canada Incorporated bought the operation in 1960. The original mill was destroyed by fire and a new mill was erected in 1961. Major additions were made to the new mill in 1979 which increased the crushing and screening capacity by 50%. Modifications were also made to the colouring plant which increased mixing capacity by 30%.
>
> "About 1800 tonnes of quarried rock are crushed daily. The crushed rock is fired and ceramically coated to give colour to the granules. About 1100 tonnes of finished product are produced daily. The Company is currently supplying all of the demand for the eastern Canadian markets and about half of the western Canadian markets for artificially coloured granules. A small amount of the product is exported to Belgium and France. The product is shipped by both truck and rail.
>
> The $50 million facilities of 3M Canada Incorporated are unique in Canada. The company also owns and operates four other plants in the United States. 3M also produces commercial grades, 3/8 inch and l/8 to 5/16 inch trap rock for the asphalt paving industry. Trap rock nonmetallic floor hardeners are supplied to the concrete floor finishing industry in various sizes for both a shake finish and floor toppings."

ARRISCRAFT CORPORATION, CAMBRIDGE

This is a direct quote from a company report:

> "Arriscraft produces two major masonry product lines. Both are described as follows:
>
> 1.Manufactured Structural Building Stone and Brick
>
> By a unique process of our own development, we manufacture high density calcium silicate masonry units for sale to the North American building market as structural building stones and bricks. We use no cement or other artificial bonding agents in our process. We extract about 150 000 tonnes of silica sand per annum from our deposit located at Cambridge, Ontario, which is the base aggregate of our manufactured product. Our manufacturing operation has been working at capacity for the past several years and projections for 1987 and 1988 indicate continuance of capacity sales and product levels. While our program of production/manufacturing modernization is ongoing, we are planning no major plant capacity expansion over the next year.
>
> Finished product installations include residential, commercial and institutional buildings in Canada and the United States.
>
> Following is a partial listing of current projects:
>
> Metro Central YMCA, Toronto
>
> Barrie Civic Centre, Barrie
>
> Harbour Front, Toronto
>
> Four Seasons World Headquarters, Toronto
>
> University of Western Ontario, London
>
> Province of Ontario Courthouse Registry Office, Ottawa
>
> Wilfred Laurier University, Waterloo
>
> Red Cross National Headquarters, Ottawa
>
> 2.Adair Quarried Marble
>
> Adair Marble is a dolomitic limestone extracted from Ontario's Bruce Peninsula. 1986 quarry tonnages will be in the range of 25 000 tonnes. All fabrication and finishing is performed at our Cambridge, Ontario plant.
>
> Typical finished product installations are: window sills, stools, hearth mantle and threshold slabs, dimensional stones of all shapes, sizes, finishes and configurations, pavement, architectural cladding, and building skin applications. In 1986 we completed a $2.5 million fabrication plant and production expansion at Cambridge. Arriscraft Corporation now has one of the most modern stone fabrication plants in the world and is now capable of competing for dimension stone work anywhere in the world.
>
> Following is a partial listing of current projects:
>
> Ontario Courthouse Registry Office, Ottawa
>
> Canadian Chancery, Washington, D.C.
>
> Bank of Nova Scotia, Ottawa
>
> One University Avenue, Toronto
>
> Rideau Canal Restor, Locks 1-2-3, Locks 4-5, Parliament Hill, Ottawa
>
> Governor General's Mansion, Quebec City
>
> Vieux Port de Quebec, P.Q."

STAKING AND EXPLORATION ACTIVITY

There are presently 14 active mining claims and 12 mining leases in Belmont Township, Peterborough County. Seven claims were cancelled and two new claims were recorded in 1986. Over 260 days of geological and geophysical work was filed for 1986 on unpatented mining claims.

REGIONAL GEOLOGICAL EVALUATION PROJECTS

TOWNSHIP AGGREGATE INVENTORIES

Aggregate Resources Inventory Papers for the Township of Scugog and the Towns of Port Colborne and Fort Erie were published in 1986. Reports for Harvey and Belmont Townships are expected to be released in 1987. Reports for Mara, Rama, and Nottawasaga Townships, in Huronia District, are also in progress.

TABLE 14.2 FROM LICENCED OPERATIONS IN CENTRAL REGION REPORTED AGGREGATE PRODUCTION BY TOWNSHIP

LINDSAY DISTRICT

TOWNSHIP	1983 tonnes	1984 tonnes	1985 tonnes
Alnwick	38,053	31,877	79,084
Asphodel	328,700	584,534	414,279
Belmont	325,508	343,507	346,555
Bexley-Carden	635,101	815,370	779,485
Cavan	55,196	39,623	24,405
Douro	14,118	38,041	8,420
Dummer	188,211	217,245	179,080
Eldon	91,525	23,451	46,313
Emily	359,843	366,801	396,309
Ennismore	62,164	23,283	59,522
Fenelon	419,557	354,931	345,529
Haldimand	104,402	148,245	98,327
Hamilton	198,793	286,118	265,521
Harvey	27,983	34,428	131,915
Hope	33,235	74,195	139,421
Manvers	1,660,671	2,610,510	2,716,421
Mariposa	174,228	154,568	175,053
Town of Newcastle:			
former Twp. of Clarke	148,095	177,864	261,899
former Twp. of Darlington	778,239	874,304	873,287
North and South Monaghan	7,926	7,880	409,642
Ops	6,054	16,082	25,652
City of Oshawa	5,764	7,609	1,965
Otonabee	97,496	93,970	123,372
Scugog:former Twp. of Reach	754,129	977,542	793,249
former Twp. of Cartwright	49,404	121,896	84,109
Smith	409,775	366,763	351,496
Verulam	130,128	97,440	144,181
Whitby	113,298	168,964	218,758
Totals	7,227,636	9,027,031	9,493,249

NIAGARA DISTRICT

TOWNSHIP	1983 tonnes	1984 tonnes	1985 tonnes
Dunnville	219,226	281,773	240,748
Fort Erie	117,902	241,888	227,861
Haldimand	900,511	1,235,302	811,560
Lincoln	979,354	1,032,300	937,561
City of Niagara Falls	39,287	36,023	20,375
Niagara-on-the-Lake	380,225	404,328	266,201
Pelham	565,354	468,574	595,825
City of Port Colborne	431,075	614,641	700,393
Wainfleet	474,512	336,161	343,661
City of Thorold	653,054	796,954	642,870
Totals	4,820,500	5,447,944	4,787,055

HURONIA DISTRICT

TOWNSHIP	1983 tonnes	1984 tonnes	1985 tonnes
Adjala	636,466	790,522	852,691
Amaranth	117,365	114,000	174,302
Essa	32,462	59,819	93,973
Flos	147,352	145,257	215,287
East Garafraxa	81,081	167,209	120,152
West Gwillimbury	37,183	15,415	59,917
Innisfil	145,636	413,803	140,247
Mara	832,088	1,072,679	1,134,122
Matchedash - (included in Orillia figures)			
Medonte	99,307	122,608	133,825
Melancthon	25,775	69,195	77,927
Mono	553,424	385,692	408,728
Mulmur	89,502	61,828	70,152
Nottawasaga	270,799	289,260	348,390
Orillia - (includes figures for Matchedash)	1,717,137	2,207,835	2,172,304
Oro	374,850	563,228	538,501
Rama	103,677	198,523	203,424
Sunnidale	202,766	160,594	199,024
Tay	464,679	536,614	645,741
Tecumseth	46,237	44,119	42,706
Tiny	201,974	192,893	240,924
Tosorontio	122,071	181,979	406,554
Vespra	274,063	612,177	393,239
Midland			
Totals	6,575,894	8,405,249	8,672,130

MAPLE DISTRICT

TOWNSHIP	1983 tonnes	1984 tonnes	1985 tonnes
Brock	1,305,531	1,204,874	1,413,062
Ajax - Pickering	257,071	277,978	213,895
Uxbridge	3,533,939	3,047,185	4,123,576
Brampton	625,186	644,576	795,132
Caledon	3,885,899	4,352,875	4,719,715
Mississauga	-	-	-
East Gwillimbury	193,850	192,762	364,589
East York	-	-	-
Georgina	320,787	293,379	346,842
King	254,619	170,059	181,430
Markham	-	-	-
Richmond Hill (included in Whitchurch-Stouffville figures)			
Vaughan	695,152	922,230	597,784
Whitchurch-Stouffville (includes Richmond Hill figures)	2,032,854	2,887,461	3,033,067
Totals	13,104,888	14,063,379	15,789,092

CAMBRIDGE DISTRICT

TOWNSHIP	1983 tonnes	1984 tonnes	1985 tonnes
City of Brantford	391,437	460,037	504,829
Brantford/Onondaga	437,688	553,919	713,685
South Dumphries	45,012	30,109	70,552
Ancaster	30,438	29,395	
Flamborough	2,070,116	2,502,051	2,422,483
Stoney Creek	463,435	538,451	571,375
Blenheim	182,607	71,561	126,593
North Dumphries	759,142	1,011,701	1,451,035
Wellesley	461,370	466,461	908,312
Wilmot	207,181	491,996	391,458
Cambridge	362,480	684,458	766,492
Kitchener			
Waterloo			
Woolwich	675,058	586,672	825,109
Arthur/West Luther	89,967	83,107	100,269
Maryborough	89,421	48,234	31,770
Peel	6,502	915	1,251
Nichol		-	-
Pilkington	244,429	-	371,086
West Garafraxa	21,638	22,371	28,152
Eramosa	28,640	42,919	127,698
Erin	149,635	179,657	241,749
Guelph	241,688	337,445	317,729
Puslinch	1,816,021	2,068,861	2,237,660
Burlington	1,592,715	1,617,530	1,753,608
Milton	3,806,495	5,403,845	6,908,325
Halton Hills	1,927,413	1,982,376	1,317,192
East Luther	32,968	54,602	71,675
Totals	16,133,496	19,268,673	22,260,087

During July and August, aggregate assessment field work was carried out in the townships of Hope, Hamilton, Haldimand, and Alnwick, in Northumberland County.

SHALE AND SANDSTONE

There is currently a high demand for these resources due to the shortage in supply of bricks and decorative stone. The Region is evaluating known and unknown resources in order to identify suitable resources to assist potential users.

MAPPING AND STRUCTURAL PATTERNS FROM INFRARED PHOTOGRAPHY

The Region and Niagara District are collaborating with the Ontario Centre for Remote Sensing on project 'mapping structural patterns' in Southern Ontario. The Centre has taken new infrared photographic and interpretive initiatives which will ultimately lead to identification of 'weak zones' in the Caledonia Hagersville-Cayuga area which might lead to subsidence in the future.

It is proposed to extend the scope of this study to the Paris area in the next year.

SHALE AND CLAY RESOURCES STUDY

This study was initiated in 1984 to assess the ceramic properties of clays and shales of Central Region for suitability in wall, floor, and roofing tile. In 1985, it was expanded to include the clays and shales of southwestern Ontario. All testing was completed in 1985 and the final report was released in early 1986 (Martini and Kwong 1986).

SECTION 38 PROJECTS

Maple District initiated an inventory of peat extraction areas in the District. The report is to be completed by December, 1986.

Niagara District staff initiated several projects for the District in 1986. Projects were undertaken to collect aggregate production data of licenced pits and quarries, to identify trends in the use of bedrock, and to determine suitability of various aggregate sources for use in concrete products. Another project involved the mapping geology and geomorphology of the Twelve-Mile Creek Drainage Basin to identify areas subject to erosion and sedimentation. The District conducted an inventory of abandoned gypsum mine workings and areas of present mine workings to identify hazardous conditions and areas of possible

TABLE 14.3: MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports

OFR 5470
OFR 5572
OFR 5583
OFR 5585
OFR 5605

Preliminary Maps - Geological Series

P.2862
P.2863
P.2870
P.2871
P.2872
P.2873
P.2874
P.2875
P.2888
P.2889
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P.2940
P.2941
P.2942
P.2943
P.2944
P.2945
P.2946
P.2948

Aggregate Resources Publications

ARIP 95
ARIP 117

Coloured Maps

MAP 2509

Miscellaneous Reports

MP 128
MP 130
MP 132
OFM 45

subsidence. A project was initiated to inventory and assess the progress of natural rehabilitation on lands disturbed by peat extraction in order to identify strategies which enhance natural regeneration. Several new projects have been submitted for approval, for 1987.

PUBLIC AWARENESS PROGRAMS

Lindsay District staff gave a presentation on the District's Mineral Resources Program to the Junior Rangers at Coldsprings Camp followed by a field trip to TRT Industries Limited in Manvers Township.

Niagara District staff conducted several tours of the peat extraction operation in the Wainfleet Bog for both regional staff and university faculty. They also presented a display on bedrock quality studies in the District for the 1986 Niagara Peninsula Geological Society display at Brock University.

Cambridge District staff participated in various seminars and tours with area municipalities to increase their awareness of the district minerals program. District staff gave a presentation to the Ontario Society for Environmental Management on multiple end-uses for pits and quarries with an examination of socio-economic issues and policy implications. Various presentations and tours were conducted for boy scout clubs and other interested groups.

The Regional Geologist participated in the exhibit at Fireworks '86 at London, Ontario. This exhibit and meeting provided opportunities to familiarize potters in Ontario with the clay resources of the province. Efforts have been made to provide samples of Ontario clays to local (Toronto) potters for experimentation. If these experiments are successful, Ontario clays may have a new market. Presently, almost all clays for potters are imported.

THE ONTARIO GEOLOGICAL SURVEY ACTIVITIES

P.J. Barnett initiated a project to map the surficial sediment of the eastern halves of the Barrie and Elmvale areas of Simcoe County at a scale of 1:50 000, to obtain information about, and a better understanding of, the sediment distributions and relationships at depth. The areas contain several known occurrences of buried mineral aggregate; however, little is known of their origin and subsurface extent. Additional field work is planned for the area in 1987.

P.F. Karrow continued mapping the western half of the Brampton area, principally in the Halton Till Plain between Georgetown and Brampton.

A comprehensive report on the limestone industries of Ontario is being updated by Mazur *et al.* (not yet printed). Field studies provided full measured geological sections and detailed descriptions of quarries which were visited. Particular attention was paid to active quarries, although abandoned quarries of 'geological significance' were also studied and will be included in a final report.

Field work was conducted in Hope, Hamilton, Haldimand and Alnwick Townships of Northumberland County during 1986 as part of the Aggregate Resources Inventory Program. The purpose of these field investigations was to confirm and supplement information gathered from various sources such as existing geological reports, maps, Ministry of Transportation and Communication data, and the Ministry of the Environment water well logs. In areas where pre-existing data was unavailable or insufficient, representative samples were taken from exposed faces and sent to the Ministry of Transportation and Communication for testing.

GEOSCIENCE RESEARCH GRANT PROGRAM

High purity limestone and dolostone are used for various industrial purposes (i.e. reduction of iron, production of lime, cement, and industrial chemicals) which involve calcining the stone. Peter P. Hudec collected and tested samples from two currently producing stone quarries in each of the following three formational units in Southern Ontario—Lockport dolomite, Detroit River limestone and Black River limestone—to determine the properties of carbonates that affect the calcining process. This would aid in the selection of the most suitable

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Riley, J.L.

1986: Laboratory Methods for Testing Peat - Ontario Peatland Inventory Project; Ontario Geological Survey, Open File Report 5572, 108p.

Verschuren, C.P., Papertzian, V.C., Kingston, P.W., and Villard, D.J.

1986: Reconnaissance Survey of Building Stones of Eastern and Central Ontario; Ontario Geological Survey, Open File Report 5585, 302p.

15. Southwestern Regional Geologist's Area, Southwestern Region

R.A. Trevail[1,2], T.R. Carter[3], B.H. Feenstra[4]

[1]Chief Geologist, Petroleum Resources Laboratory, Ontario Ministry of Natural Resources, London

[2]Regional Geologist, Ontario Ministry of Natural Resources, London

[3]Senior Petroleum Geologist, Ontario Ministry of Natural Resources, London

[4]Mineral Resource Geologist, Ontario Ministry of Natural Resources, London

INTRODUCTION

Southwestern Region is unique in the Province because the conventional mineral resources program is combined with the petroleum resources program within the administrative framework of the Ministry of Natural Resources to provide a multi-faceted approach to encouraging mineral exploration and development. All aspects of the geological program are carried out from the Petroleum Resources Laboratory located at 458 Central Avenue, London. Staff include R.A. Trevail, fulfilling the dual role of Chief Geologist of the laboratory and Regional Geologist; B.H. Feenstra, Mineral Resources Geologist; T.R. Carter, Senior Petroleum Geologist; M. Campbell, Petroleum Resources Lab Technician; and M. Bernardo, clerk-typist. Other staff employed during the year include Peter Dollar, Greg Brown, and Debra Parker (geological assistants), Susan Brown (clerk-typist), R. Kilpatrick (Futures), Andre LaFlamme (Ontario/Quebec Student Exchange Program) and R. Erdmann and Steve Harding (both Experience '86). J.W.E. Lau, Mineral Resources Supervisor in Aylmer, was seconded to the Lab beginning April 1 to assist B.H. Feenstra with reviewing the Pits and Quarries Control Act applications and other land use planning matters.

Petroleum Resources Inspectors, responsible for the enforcement of the Petroleum Resources Act, are located at District Offices in Aylmer, Chatham, and Simcoe. Pits and Quarries Inspectors, responsible for the enforcement of the Pits and Quarries Control Act, are located at District Offices in Aylmer, Chatham, Owen Sound, Simcoe, and Wingham.

At the time of writing, the Ministry of Northern Development and Mines was in the process of establishing a Resident Geologist position responsible for the area lying within the Ministry of Natural Resources' Southwestern and Central regions. Further details regarding location, personnel, and program responsibilities were unavailable.

REGIONAL GEOLOGIST OFFICE ACTIVITIES

Much of the Regional Geologist staff's time was spent in consultation with technical and professional staff of the oil and gas industry, petrochemical manufacturers and natural gas utilities, other government ministries and agencies, and university researchers. The collapse of world oil prices in early 1986 has resulted in a significant decline in the number of geologists and engineers from oil and gas exploration companies utilizing the services and facilities of the Petroleum Resources Laboratory, although these still comprise the largest client group.

An increased proportion of the Regional Geologist staff's time was spent in dealing with groundwater-related issues, in consultation and cooperation with staff of the Ministry of the Environment. Staff provided geological and engineering well data in relation to recent concerns about possible migration to the surface of liquid industrial wastes injected into the Detroit River Formation in the 1960s and early 1970s. Injection of industrial wastes into the subsurface has not been permitted since December 31, 1976. Ministry of Environment staff also referred two instances of contamination of domestic water wells in the Regional Municipality of Haldimand-Norfolk to the Petroleum Resources Section for investigation of a possible relationship to abandoned and/or producing oil and gas wells. One of the cases involved the Crowland gas storage pool and considerable staff time was spent in the investigation of the complaints and the preparation of a report. The investigation revealed no connection between the water well problems and the operation of the storage pool. The other incident is unresolved and may be the subject of further study.

Staff attended various conferences and conventions during the year. R. Trevail presented a paper at the annual meeting of the Canadian Society of Petroleum Geologists in Calgary in June, 1986. The paper, entitled "Exploration and Development Opportunities in Ontario", was well received, resulting in several inquiries from Calgary-based companies. Trevail was also chairman of the technical program for the 1986 Ontario Petroleum Institute Annual Convention which was held in London.

One paper was published during 1986. Carter, Parker, and Trevail co-authored a paper with Graham Campbell, Acting Director, Resource Evaluation, Canada Oil and Gas Lands Administration, Ottawa, which was entitled "Oil and Gas Developments in Eastern Canada in 1985". It was published in the October issue of the Bulletin of the American Association of Petroleum Geologists. Work in progress or completed will result in several publications in the near future. Trevail has completed the final stages of preparation of two "Oil and Gas Exploration, Drilling, and Production Summaries" for 1983 and 1984. These summaries were delayed due to staffing shortages and major changes being implemented to the regional computer system which necessitated the redesign of the well cards. Carter has completed an updated computerized index of all available oil and gas analyses for samples from wells in Ontario, and M. Campbell is updating the computerized drill core index. Summaries of both indexes will be published in the 1985 Exploration, Drilling, and Production Summary.

Trevail and Carter commenced work on a major new project in 1986. The objective is to establish a new set of reference stratigraphic cross sections for the subsurface Paleozoic formations in southwestern Ontario, using diagnostic gamma-ray and neutron log responses to pick the formation tops. As part of this exercise, the currently accepted diagnostic log responses for all formation tops will be re-examined and new "picks" proposed, if necessary.

Trevail and V.H. Singhroy (Ontario Centre for Remote Sensing) continued work on a long term project investigating the applicability of various remote sensing techniques to oil and gas exploration in Ontario. The test site is an area overlying the Willey Pool located 35 km southwest of London. This particular pool produces oil from Cambrian sandstones in a combination stratigraphic/fault-bounded trap. To date, 40 kms of MEIS II imagery and colour infrared have been acquired through the services of the Canadian Centre for Remote Sensing. This data, once processed, will be compared with soil/gas geochemistry information provided jointly by BP Canada Incorporated and Barringer Magenta Limited to determine if a relationship exists between anomalies occuring in both data sets. If such a correlation exists, oil and gas exploration companies will be able to effectively use MEIS II data as one component in their reconnaissance exploration programs in southwestern Ontario. Preliminary results of this research will be presented at the Eleventh Canadian Symposium on Remote Sensing to be held in Waterloo, from June 22 to 25, 1987.

Construction began in late November on a new drill core and cuttings storage building on a site adjacent to the Ministry of Natural Resources Southwest Regional office on Exeter Road. Construction is anticipated to take 18 weeks. Upon completion, the current building housing the Petroleum Resources Laboratory will be vacated. It is planned that geological staff now at the laboratory will join other Petroleum Resources Section staff in the Southwest Regional office (administrative and regulatory). The sample storage library will be staffed with a lab technician and a clerk.

PETROLEUM RESOURCES ACTIVITIES

Hydrocarbon Energy Resources Program

The Hydrocarbon Energy Resources Program was launched by the Ministry of Natural Resources in 1981 as part of the Ministry's mandate to carry out an inventory of the Province's hydrocarbon energy resources, and to determine the contribution that they could make to greater energy self-sufficiency. The program was funded by the Ontario Ministry of Treasury and Economics through the Board of Industrial Leadership and Development. As part of this program, in December of 1982, the Petroleum Resources Section began a project to determine the province's reserves and potential resources of conventional oil and gas. Work on the project was completed under contract to the Ministry of Natural Resources. The geological work was performed or supervised by Bruce Bailey, president of Bailey Geological Services Limited, and the engineering by Robert O. Cochrane, a consulting petroleum engineer. The project ended on March 31, 1986.

Four reports have been published to date. The most recent release, on November 14, 1986, was of a report entitled "Evaluation of the Conventional and Potential Oil and Gas Reserves of the Silurian Sandstone Reservoirs of Ontario" (Bailey and Cochrane 1986). The report was published by the Ontario Geological Survey as Open File Report 5578, along with 87 preliminary maps at a scale of 1:100 000. Twelve of the maps show the location of Silurian sandstone pools in Ontario. There are 28 maps of the structure on the top of the Rochester Formation. The remaining 47 maps show net sandstone isopach contours of the Thorold and Whirlpool Formations, and gross sandstone isopach contours of the Grimsby Formation. In addition, detailed structure contour maps on the top of the Irondequoit-Reynales Formation, at a scale of 1:20 000, were prepared for the Hemlock and Walsh gas pools.

Two remaining reports are in the final stages of preparation: the Silurian Reef Complex, and Final reports. Copies of the Silurian Sandstone report and all previous open file reports can currently be obtained from:

M.C. Reproductions
966 Pantera Drive, Unit #14
Mississauga, Ontario
L4W 2S1
Tel. (416) 624-5716

A paper entitled "A New Look at the Development, Configuration, and Trapping Mechanisms of the Silurian Guelph Reefs of Southwestern Ontario" was presented by S.M.B. Bailey at the 25th Annual Convention of the Ontario Petroleum Institute, in London, on October 21, 1986. The paper was a summary of the results of the Silurian Reef Complex study.

Ontario Energy Board

During 1986, staff of the Petroleum Resources Section participated in one formal hearing, E.B.O. 123, which dealt with an application by Union Gas Limited for a regulation extending the boundaries of its Bickford gas storage pool in Sombra Township, Lambton County, and for authorization to inject, store, or remove gas from the extended pool. Application for a hearing was made on June 7, 1985. After the filing of the applicant's prefiled evidence, the Petroleum Resources Section was asked by Board staff to examine the applicant's evidence and to provide expert witness testimony at the hearing.

The hearing was held in Sarnia from February 18 to 21, 1986. Four witnesses testified on behalf of the applicant. R.M. Rybansky, P.A. Palonen, and R.A. Trevail testified on behalf of the Ministry of Natural Resources at the request of the Board staff. Three witnesses were called by various intervenors and five intervenors testified on their own behalf.

The main issue of the hearing was Union's contention that the gas-bearing portion of the storage pool extended to the east beyond its existing boundary, and that a producing gas well known as Baslen 18 in the northern half of lot 9, concession XII, Sombra Township was in communication with the pool. The well is owned by B. Magder Enterprises and when first drilled in 1974 was not a commercial producer. In 1979, following fracture stimulation, the well was recompleted as a gas producer.

The Bickford gas storage pool was formerly a gas-producing reef characterized by good porosity and permeability. The pool was designated as a gas storage area by Ontario Regulation 330 in 1962 and put into operation in 1972. Currently the pool has a working storage capacity of 481 106 m^3, or approximately 18% of Union's total working storage capacity. Gas storage pools such as Bickford are a valuable asset to the Province of Ontario and it is important that their integrity remain intact. It was Union's position that the Baslen 18 well threatened the integrity of the storage pool and it was in the public interest that the well be permanently shut-in by including it within the designated storage pool boundaries, within which no drilling is permitted without a reference to the Board.

In its report, the Board accepted the geological and reservoir pressure evidence submitted by the applicant and Ministry of Natural Resources witnesses which indicated that the Baslen 18 well was in communication with the Bickford pool. The Board recommended to the Lieutenant-Governor that a regulation be issued extending the existing boundaries of the pool in the manner applied for by the applicant.

Oil and Gas Exploration and Development

Final statistics indicate that exploration and development activity continued at a brisk pace in 1985. A total of 193 wells were drilled for a total length of 103 261 m, compared to 200 wells totaling 97 158 m in 1984. The 1985 total includes 25 service wells which consisted of six stratigraphic tests, three disposal, six brine, eight gas storage, one LPG storage, and one re-entry. A total of 67 exploratory and 101 development wells were drilled, down marginally from 1984. Twenty-seven percent of the exploratory wells were successfully completed as oil and/or gas producers, and 69% of the development wells were successfully completed. This resulted in 25 wells completed as oil producers (four exploratory, 21 development) and 63 wells completed as gas producers (14 exploratory, 49 development). Further details are available in Carter *et al.* (1986).

The drop in world oil prices, combined with the end of the federal government's National Energy Program (NEP) and Petroleum Incentives Program (PIP) at the end of March, had a major negative impact on the amount of exploration activity conducted in Ontario in 1986. The deregulation of the Canadian natural gas industry, which took effect on November 1, 1986, also appears to have had a negative impact. In November of 1986, a meeting was held in London between Union Gas Limited and representatives of Ontario's natural gas producers to discuss the possible effects of deregulation. Union estimated that deregulation would result in an 18% decrease in the purchase price paid to producers. At the time of writing, however, prices remained steady.

Drilling results for the current year are available for the period up to and including October 31, 1986. Table 15.1 provides a summary of wells drilled, listed by county and township. Locations of wells completed as oil and/or gas producers are indicated on Figure 15.1. Statistics indicate that land-based drilling is down a modest eight percent from the same period in 1985, divided among 50 exploratory, 15 development, and 20 service wells. A total of 47 404 m has been drilled to date. The success rate for exploratory drilling has been 44%, with 17 wells completed as gas producers and five as oil producers. Six wells have been suspended and 21 were dry holes. Thirteen of the gas discoveries are located in Norfolk County and are completed within Silurian sandstones. Development drilling has been 80% successful, with six wells completed as gas producers and six as oil producers. Three wells were dry holes. Five of the gas producers are located in Norfolk County and are completed within Silurian sandstones.

Exploration for deep reservoirs in the Middle Ordovician carbonate rocks of the Trenton and Black River Groups proceeded at a brisk pace in 1986, continuing a trend begun in 1983 with the discovery of the Dover 7-5-VE and Mersea 1-15-B pools. Twenty exploratory wells have been drilled into Ordovician and/or Cambrian strata thus far in 1986. Domego Terron #2, Mersea 6-16-B, was completed as an oil producer in a successful exploratory test of a possible extension of the Mersea 1-15-B pool. Consumers *et al.* 34011, Romney 3-8-II, was completed as an oil producer in Trenton-Black River carbonate rocks, and Domego #1, Blandford 1-4-V, was completed as a gas producer in Cambrian sandstones. Six of the remaining holes were suspended and the rest were dry holes. Only one development well was drilled into Ordovician strata. Domego Tiessen #3, Mersea 7-15-A, was drilled as a follow-up to an earlier successful exploratory test (Domego Terron #2) and was completed as an oil producer in Trenton-Black River strata. Only six wells were drilled offshore Lake Erie in 1986, compared to 75 in 1985. All of the wells were drilled by Place Gas and Oil Company Limited. The results are not yet known and are not reported on Table 15.1. The Consumers' Gas Company Limited, Pembina Exploration Company Limited, and Diamond Shamrock Exploration of Canada Limited did not drill any wells in Lake Erie during 1986. The principal reason for the dramatic decrease appears to be uncertainties related to deregulation of the domestic natural gas industry and world oil and gas prices. Consumers Gas also cites a lack of shallow gas exploration targets on their Lake Erie acreage. Consumers has indicated plans to drill six development wells in 1987, with additional development drilling at this pace for the near future. Additional development drilling would be dependent on results of ongoing reservoir engineering studies of the producing gas pools.

Devran Petroleum Limited of London, and Shell Canada Resources Limited completed the excavation of a vertical shaft to a depth of approximately 120 m through Devonian shales and carbonate rocks, into the pay zone of the abandoned Sarnia-London Road oil pool. Excavation of the shaft and two underground work/production stations was completed by the Summer of 1986 and installation of a hoist and computerized ventilation, safety, and production equipment

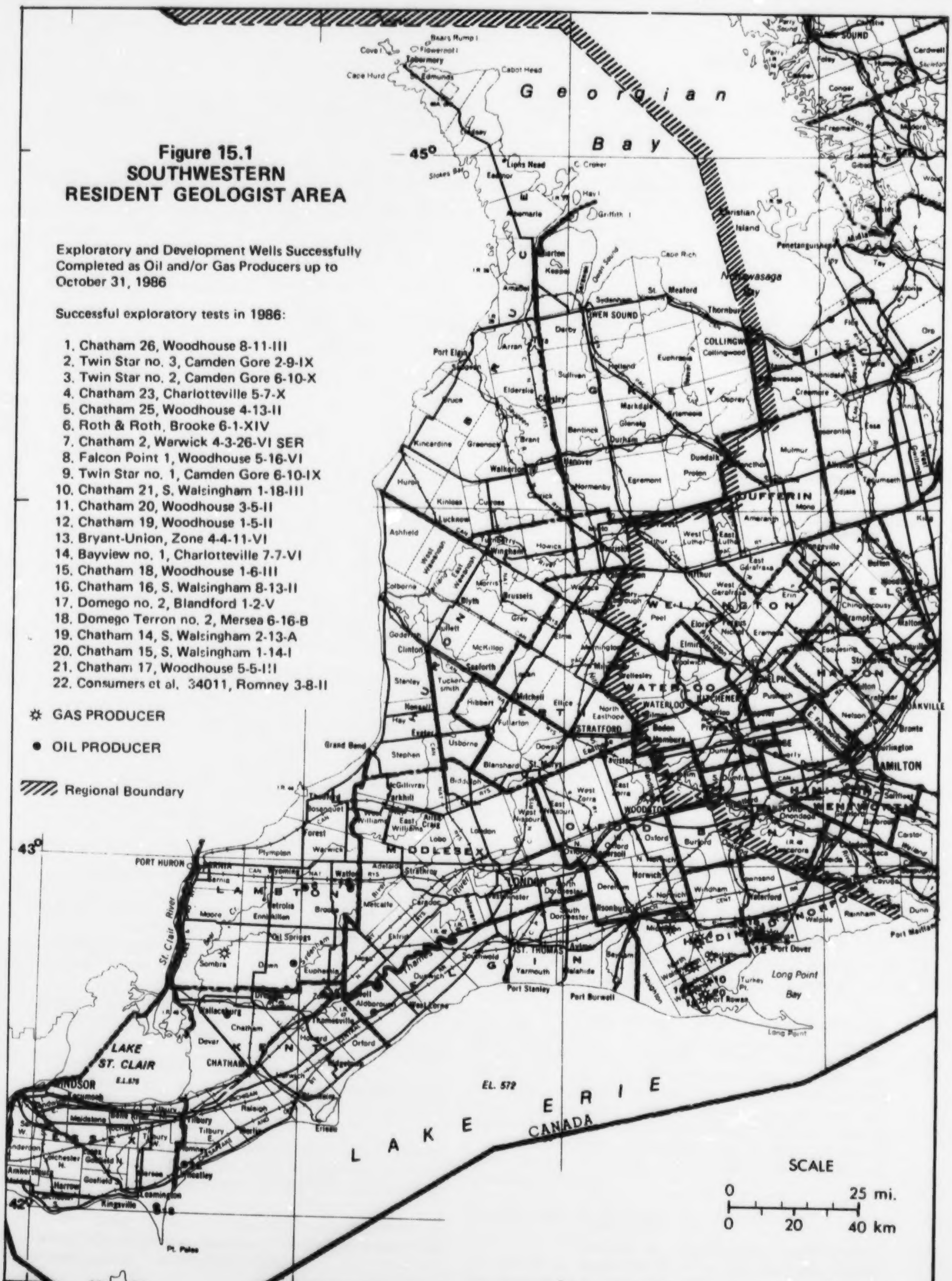

Figure 15.1
SOUTHWESTERN RESIDENT GEOLOGIST AREA

Exploratory and Development Wells Successfully Completed as Oil and/or Gas Producers up to October 31, 1986

Successful exploratory tests in 1986:

1. Chatham 26, Woodhouse 8-11-III
2. Twin Star no. 3, Camden Gore 2-9-IX
3. Twin Star no. 2, Camden Gore 6-10-X
4. Chatham 23, Charlotteville 5-7-X
5. Chatham 25, Woodhouse 4-13-II
6. Roth & Roth, Brooke 6-1-XIV
7. Chatham 2, Warwick 4-3-26-VI SER
8. Falcon Point 1, Woodhouse 5-16-VI
9. Twin Star no. 1, Camden Gore 6-10-IX
10. Chatham 21, S. Walsingham 1-18-III
11. Chatham 20, Woodhouse 3-5-II
12. Chatham 19, Woodhouse 1-5-II
13. Bryant-Union, Zone 4-4-11-VI
14. Bayview no. 1, Charlotteville 7-7-VI
15. Chatham 18, Woodhouse 1-6-III
16. Chatham 16, S. Walsingham 8-13-II
17. Domego no. 2, Blandford 1-2-V
18. Domego Terron no. 2, Mersea 6-16-B
19. Chatham 14, S. Walsingham 2-13-A
20. Chatham 15, S. Walsingham 1-14-I
21. Chatham 17, Woodhouse 5-5-III
22. Consumers et al. 34011, Romney 3-8-II

☼ GAS PRODUCER

● OIL PRODUCER

▨ Regional Boundary

Georgian Bay
45°
43°
42°
83°
82°
81°
80°
LAKE ST. CLAIR
LAKE ERIE
EL. 572
CANADA
Long Point Bay
OWEN SOUND
COLLINGWOOD
DUFFERIN
WELLINGTON
PEEL
WATERLOO
KITCHENER
STRATFORD
HALTON
OAKVILLE
HAMILTON
WOODSTOCK
OXFORD
MIDDLESEX
LONDON
LAMBTON
PORT HURON
ST. THOMAS
ELGIN
KENT
CHATHAM
WINDSOR
ESSEX
NORFOLK
Port Dover
Port Stanley
Port Burwell
Grand Bend
St. Clair River
Pt. Pelee
SCALE
0
25 mi.
0
20
40 km

TABLE 15.1 SUMMARY OF WELLS DRILLED

County	Township	Exploratory						Development						Service		Total	
		Gas	Oil	Dry	Susp	Total Wells	Total Metres	Gas	Oil	Dry	Susp	Total Wells	Total Metres	Total Wells	Total Metres	Wells	Metres
Elgin	Aldborough			1		1	130.0					0				1	130.0
	Dunwich			1		1	1125.9					0				1	1125.9
	Gosfield N.			1		1	942.0					0				1	942.0
	Southwold				1	1	1155.0					0				1	1155.0
Essex	Colchester S.			1		1	937.0					0				1	937.0
	Maidstone			1		1	1083.0					0				1	1083.0
	Mersea		1		1	2	1880.1		1			1	795.2	1	184.0	4	2859.3
Kent	Camden Gore	3				3	1628.4					0				3	1628.4
	Chatham			1		1	596.2		1			1	500.0			2	1096.2
	Howard			1		1	650.0					0				1	650.0
	Raleigh			1		1	1103.4					0				1	1103.4
	Romney		1		1	2	2222.0					0				2	2222.0
	Zone		1	1		2	240.9			1		1	113.5			3	354.4
Lambton	Brooke		1	2		3	2473.2		2	1		3	370.4			6	2843.6
	Dawn				1	1	1202.0		1			1	6.7	3	1204.3	5	2413.0
	Enniskillen					0				1		1	614.0	1	198.0	2	812.0
	Euphemia			1		1	571.0					0				1	571.0
	Moore			2	1	3	3313.0					0		9	5852.3	12	9165.3
	Sarnia					0						0		4	541.5	4	541.5
	Sombra			2	1	3	3029.5	1				1	624.0	2	1197.0	6	4850.5
	Warwick		1				138.1		1			1	138.1			1	276.2
																	0.0
Manitoulin	Sandfield			1		1	274.3					0				1	274.3
Middlesex	Caradoc			1		1	120.7					0				1	120.7
	Mosa			1		1	1158.5					0				1	1158.5
Norfolk	Charlotteville	2		1		3	1209.4	1				1	367.6			4	1577.0
	Middleton					0		2				2	725.0			2	725.0
	N.Walsingham					0		2				2	794.3			2	794.3
	S.Walsingham	4				4	1735.9					0				4	1735.9
	Woodhouse	7				7	2366.1					0				7	2366.1
Oxford	Blandford	1		1		2	1763.0					0				2	1763.0
SUB TOTALS		17	5	21	6	49	33048.6	6	6	3	0	15	5048.8	20	9177.1	84	47274.5
Lake Erie						0						0				0	0.0
Lost Hole	Essex/N.Gosfld					1	130.0					0				1	130.0
TOTAL		17	5	21	6	50	33178.6	6	6	3	0	15	5048.8	20	9177.1	85	47404.5

was begun. Drilling of a radial pattern of up to 24 horizontal drillholes into the pay zone was underway at the time of writing (November, 1986).

In early 1986, the Ontario government decided to wind down the affairs of Onexco, the exploration division of the Ontario Energy Corporation. The assets of the company have been put up for sale, with a deal on the sale of its Ontario assets expected to be announced shortly.

Oil and Gas Production

Final production figures for 1985 indicate that oil production in Ontario increased by 25%, to 112 963.7 m^3 from 90 317.6 m^3 in 1984. This increase was due almost entirely to commencement of full production from the Dover 7-5-VE and Mersea 1-15-B pools which together accounted for approximately 33% of the total Ontario production in 1985. For the 1986 calendar year, oil production to the end of October was 113 520.1 m^3, a 20% increase over the comparable period in 1985. The increase is again attributable largely to increased production from the Dover 7-5-VE and Mersea 1-15-B pools due to the effects of additional wells put on production during 1985 and 1986. Together these two pools now account for 41% of Ontario's daily oil production of 370 m^3.

Production of natural gas increased approximately eight percent in 1985 to 589 746.6X10^3 m^3. This consisted of 430 784.9X10^3 m^3 produced from wells on Lake Erie, and 158 961.7 10^3 m^3 from wells on land. For the 1986 calendar year, reported gas production to the end of October was 328 777.3X10^3 m^3. However, this figure does not include several months of production from pools on Lake Erie operated by the Consumers' Gas Company Limited and Pembina Exploration Company Limited. It is not possible to make an accurate projection of final 1986 gas production, but it is anticipated that production will be at the same level as in 1985.

Current Research

A considerable amount of research on the Paleozoic rocks of Ontario, or related topics, is currently underway at various universities and government agencies. A brief summary of the names of researchers, their affiliation, and the topic of research, is presented below.

Z. Alymann - B.Sc., University of Windsor (F. Simpson). Migration of formation fluid related to hydrocarbon potential in Mersea Township.

J. Chatsis - University of Waterloo. Pore shapes in selected carbonate reservoirs.

P. Churcher - M.Sc., University of Waterloo (M.B. Dusseault). Clay mineralogy in the Fletcher and Wilkesport carbonate reservoirs.

D. Cleland - B.Sc., University of Western Ontario (G. Plint). Subsurface analysis of Paleozoic strata within the southwest Clear Creek Pool, north-central Lake Erie.

P. Dollar - M.Sc., University of Waterloo (S. Frape). Geochemical studies of formation waters, Paleozoic strata, Southwestern Ontario.

D. Grimes - M.Sc., Queen's University (L. Smith). Depositional and diagenetic history of the Fletcher and Rosedale reef reservoirs.

K. Hanf - B.Sc., University of Windsor (F. Simpson). Migration of formation fluid related to hydrocarbon potential in west central Lake Erie.

S. Haynes - Brock University/Ministry of Natural Resources Niagara District. Evaluation of and stratigraphic and lithologic associations of gypsum in the Salina Formation, Haldimand-Norfolk-Niagara-Brant areas.

James - B.Sc., University of Western Ontario (G. Winder). Sedimentology of Ordovician Trenton Formation in Howard and Harwich Townships, Kent County, Ontario.

D. Kassenaar - M.Sc., University of Waterloo (M.B. Dusseault). Development of a PC-based interactive geophysical log interpretation system.

V. Singhroy - Ontario Centre for Remote Sensing. Integrated studies for seismic hazard assessment in southern Ontario.

L. Smith - Queen's University. Karst episodes and permiability development, Silurian reef reservoirs.

R. Vesely - B.Sc., University of Western Ontario (G. Plint). Petroleum geology of the Clear Creek gas pool, southwestern Ontario.

MINERAL RESOURCES ACTIVITIES

The primary objective of the mineral resources program in Southwestern Region of the Ministry of Natural Resources is to stimulate exploration and development of industrial mineral resources in the region. The program provides information and professional advice regarding local and regional geology, mineral deposits, exploration, mining, mineral processing, uses and markets. The program will be transferred to the Ministry of Northern Development and Mines early in 1987.

Current extraction of Paleozoic limestone, dolostone, and shale, and Quaternary sand, gravel, and clay at pits and quarries in the region is for construction aggregate, cement, lime, fluxstone, building stone and clay products, and miscellaneous markets such as glass, agriculture, and environmental control applications. Current extraction of salt from the Paleozoic Salina Formation at underground mines and brine wells is primarily for de-icing, chemical, and foodgrade markets.

The following sections of the report summarize pertinent activities by private industry, Southwestern Region staff, and the Ontario Geological Survey. Region's activities include property examinations and area specific resource inventory and assessment projects as a means of stimulating new exploration and development, as well as providing effective input to resource planning, and conducting or participating in conferences, seminars, and fieldtrips as a means of resource promotion.

Construction Aggregates

The 1986 production of construction aggregates in the region is expected to show an increase, locally as much as 30%, over the 1985 level.

Region provided detailed resource inventory and assessment information for several areas where higher quality sand and gravel aggregate sources are in short supply, namely:

1. in southwestern Lake St. Clair where, with the cooperation of the Canada Centre for Inland Waters, it was found that granular materials are too thinly spread over the lakebed for dredging purposes to alleviate pending shortages of natural asphalt and concrete sand in Essex County
2. at three sites in the McGregor-Leamington area of Essex County where drill cores to depths of 30 m were taken of Lucas and Dundee Formation limestone bedrock covered by relatively thin glacial drift overburden. After laboratory testing by the Ministry of Transportation and Communications all core sections appear suitable for granular uses while selected sections appear suitable for asphaltic and concrete aggregate uses
3. in Kent County, where the centrally located Pinehurst buried sand and gravel deposit near Chatham; a) yields annually between 50 and 70% of the total county aggregate production, b) is the only known high-quality aggregate resource (asphalt and concrete stone and sand, granular 'A') in the county, keeping delivery prices of imported aggregates from more distant sources in Ontario and Michigan at a very competitive level, and c) has remaining recoverable licensed resources for only 10 years and potentially recoverable resources for an additional 15 years in unlicensed lands under severe agricultural constraint
4. in the Owen Sound and Meaford-Thornbury areas in Grey County, where remaining surficial deposits of suitable sand and gravel are few and small forcing established local aggregate operators looking for the next-closest, accessable, stable, long-term, high-quality aggregate resource to propose quarry developments in the Amabel Formation dolostone (chiefly Wiarton-Colpoy Bay Member) within the Niagara Escarpment Plan Rural Area (Harold Sutherland Construction Limited, Keppel Township) or on agricultural-zoned land very close to it (McKean Quarries Limited, Euphrasia Township)

The Engineering and Terrain Geology Section of the Ontario Geological Survey:

1. completed field investigations of the geology at active quarry operations in the Region as part of an up-to-date comprehensive report on the limestone industries of Ontario
2. completed field investigations of sand and gravel, and bedrock aggregate resources in Euphrasia Township, Grey County
3. published the results of aggregate resource inventories of: Zorra Township, in Oxford County, north of Ingersoll (ARIP 61); Hullett Township, in Huron County, northeast of Clinton (ARIP 108); and Elma Township, in Perth County southwest of Listowel (ARIP 110)

Cement and Lime

The 1986 production of crushed limestone and clay aggregates for cement manufacturing in the Region, and of crushed limestone primarily for calcining and use in soda ash or as flux in iron and steel, and for fluxstone in iron and steel, is expected to show an increase, locally as much as 20%, over the 1985 level.

Quarrying activity for grey Portland cement types at the wet-process Woodstock plant of Canada Cement LaFarge Limited continued in the high-calcium limestone of the Lucas Formation (Anderdon Member) and underlying siliceous (cherty) limestones of the Amherstburg and Bois Blanc Formations. Clay materials are extracted from the abundant but complex glacial drift overburden at the quarry.

Quarrying activity for grey Portland cement types at the dry-process St. Marys plant of St. Marys Cement Company continued in limestones of the Dundee and Lucas Formations. Glacial clay aggregates are also extracted from the overburden at the quarry.

The Woodstock plant of Federal White Cement is one of the largest white cement producers in North America. The dry-process plant uses a raw mix composed of 80% crushed high-calcium limestone (Lucas Formation, Anderdon Member) obtained from local producers in the Beachville-Ingersoll area, and 20% imported silica fines, kaolin clay, and high-reflectance gypsum and anhydrite.

In the Beachville-Ingersoll 'lime-valley' area, BeachviLime Limited (Dofasco), with two quarry operations, and Stelco Incorporated, with one quarry operation, continued to extract high-calcium limestone from the Lucas Formation (Anderdon Member) primarily for on-site calcining and production of other flux materials as mainly captive supply to the iron and steel industry.

General Chemical (formerly Allied Chemical Canada Limited) continued production of +25 mm (1 inch) screenings of high-calcium limestone (Lucas Formation, Anderdon Member) at its McGregor Quarry in the Windsor-Amherstburg area. At the Amherstburg plant, the limestone screenings are calcined and combined with ammoniated salt-in-brine for use in the manufacture of soda ash and by-product calcium chloride by the Solvay process.

Rock Salt

Rock salt was extracted during 1986 in the Region by underground mining methods. A modified room-and-pillar method is used in the 23 m thick Salina Formation A-2 Unit bed at a depth of 537 m at Domtar's Goderich Mine, and by conventional room-and-pillar design as employed in the 7.5 m thick Middle F Unit bed at a depth of 297 m at Canadian Salt's Ojibway Mine at Windsor. Rock salt is primarily used in deicing (80 to 85%), in chloralkali manufacture (12 to 20%), and in minor miscellaneous markets.

Salt-in-Brine

General Chemical continued to extract salt using an underground solution method for on-site industrial use from Salina Formation B Unit salt beds 30 and

21 m thick at average depth of 335 m in the Amherstburg area. Dow Chemical also continued to extract salt by brining for industrial use from B Unit and A-2 Unit beds 80 and 37 m thick respectively at average depths of 740 and 780 m in the Sarnia-Corunna area. The extraction of salt by solution mining techniques by both companies is entirely for the industrial production of chloralkalis (i.e. chlorine and caustic soda at Dow Chemical and soda ash at General Chemical).

Fine Granular Vacuum Salt

The Canadian Salt Company Limited and Domtar Incorporated continued to extract B Unit salt brines from beds 30 and 55 m thick respectively at depths varying between 427 and 457 m in the Windsor and Goderich areas for the manufacture of evaporated, purified, fine granular salt products for open markets. The extraction of salt brines by solution techniques followed by purification and vacuum-pan evaporation is mainly for food-grade salt markets (60%), chemical industry (30 to 40%), and agricultural uses (10 to 20%).

Building Stone

The 1986 production of building stone from the seven Bruce Peninsula quarry operations is expected to show an increase, locally as much as 25%, over the 1985 level.

The well known and largest Bruce Peninsula operation of Adair Marble Quarries Division of Arriscraft Corporation quarries blue-grey mottles, thick-bedded Wiarton-Colpay Bay Member dolostone of the Amabel Formation, producing 10 tonne size mill blocks by drilling and broaching. The company has carried out a large amount of stripping during 1986, doubling the size of its quarry at Hope Bay. The company plans to acquire a wire saw assembly in 1987 for sawing the thick-bedded dolostone at the quarry.

Owen Sound Ledgerock Limited, the next largest building stone producer in the Bruce Peninsula, quarries thin- to medium-bedded Eramosa Member dolostone at one operation near Owen Sound and another near Wiarton for ledgerock, flagstone, drywall stone, patio and sidewalk stone, sills, hearths, mantels, capping, and Eramosa Marble. The company plans expansion of both its quarry operations based on increased demand for sawn products in general and Eramosa Marble in particular. The company plans to construct a new finishing plant at its Owen Sound quarry site.

The Engineering and Terrain Geology Section of the Ontario Geological Survey carried out detailed geological surveying and stratigraphic studies to evaluate building stone potential of the Eramosa Member dolostone at licensed and abandoned quarry sites and other exposures in the Bruce Peninsula. This project is part of the Canada-Ontario Mineral Development Agreement (COMDA). Region staff provided input regarding selection of Eramosa dolostone deposits and specifications for assessment of their marble potential.

Clay Products

During 1986, only two companies in the Region extracted local clays for the production of drain tile and brick. Martin Clay Products used Arkona Formation shale from their Hungry Hollow deposit, Queenston Formation shale from their Georgetown deposit, and grog in the manufacture of drain tile and, for the first time, brick at their Parkhill and Wallenstein plants. A small number of extruded bricks and drain tiles were produced at the Wallenstein plant before it was sold to National Sewer Pipe Limited. Martin Clay Products has consolidated its drain tile and very modest brick production entirely to the Parkhill plant. Total clay drain tile production for both plants in 1986 was 40% below the 1985 level. Drain tile production is expected to decrease for them in 1987. Brick production, however, is expected to show a significant increase. Paisley Tile Company Limited used clay from a local glacial lake deposit in more moderate drain tile production. The Norwich Tile yard produced very little drain tile from clay extracted in 1985 from a local glacial lake deposit, and the Coultis and Son Limited yard in Thedford abandoned drain tile production from local Arkona Formation shale altogether.

Other plants in the Region still import clays for the manufacture of vitrified structural clay products, ceramic tile, and pottery. Canada Vitrified Products (Division of National Sewer Pipe Limited) in St. Thomas is the sole Ontario manufacturer of clay flue linings and sewer pipes. The 1986 production of flue linings is 25% over the 1985 level, with a minimal amount for export to the United States. Clay sewer pipe production is only ten % of total flue lining since Ontario demand is small and decreasing, and mainly filled by imports from the United States. The company plans start-up of brick production in 1987 at the recently acquired Wallenstein plant. Production of mosaic tile at Windsor Ceramic Tile Limited reached only two million square feet since the Windsor plant was closed from January to June of 1986, and only a two-line production system was operating during the remainder of the year.

During 1986, Region staff organized, with the help of numerous individuals in the various geological districts of the Ministry of Northern Development and Mines, a display of Ontario pottery and raw materials at the annual Ontario Potters Association Conference in London that was well received by potters and clay suppliers alike. In addition, Region staff provided input to the provincial study of the Clay and Shale Industries of Ontario, and presented a progress paper together with Greg Brown of the University of Western Ontario at the Ontario Geoscience Research Seminar on a joint research project regarding kaolinite in the Bedford Shale and derived glacial clays in the Lake St. Clair Region.

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